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REMEDIAL INVESTIGATION BADGER ARMY AMMUNITION PLANT

BARABOO, WISCONSIN

FINAL
REMEDIAL INVESTIGATION REPORT
APPENDIX
DATA ITEM A009

B7/62

94-17947

APPENDICES A THROUGH D. VOLUME 1 OF 7

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UNITED STATES ARMY
TOXIC AND HAZARDOUS MATERIALS AGENCY
ABERDEEN PROVING GROUND, MARYLAND

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REMEDIAL INVESTIGATION BADGER ARMY AMMUNITION PLANT

APPENDICES

APPENDIX A -	LOCATION-SPECIFIC AND CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS	Vol. 1
APPENDIX B -	SOIL VAPOR SURVEY	Vol. 1
APPENDIX C -	SURFACE GEOPHYSICAL SURVEY	Vol. 1
APPENDIX D -	DRILLING AND SOIL SAMPLING PROGRAM	Vol. 1
	D.1 Test Pit, Soil Boring, and Monitoring Wells Boring Logs	Vol. 1
	D.2 Field Data Records - Soil, Sediments, and Surface Water	Vol. 2
	D.3 Monitoring Well Construction Diagrams	Vol. 2
	D.4 Well Development Records	Vol. 2
	D.5 Regional Water Supply Well Logs	Vol. 2
APPENDIX E -	BOREHOLE GEOPHYSICAL SURVEY	Vol. 2
APPENDIX F -	HORIZONTAL AND VERTICAL SURVEY	Vol. 2
APPENDIX G -	GROUNDWATER ELEVATIONS AND FIELD	
	DATA RECORDS	Vol. 3
	G.1 Groundwater Elevation Data	Vol. 3
	G.2 Field Data Records - Round I and II	Vol. 3
	G.3 Field Data Records - Round One	Vol. 3
	G.4 Field Data Records - Round Two	Vol. 3
	G.5 Field Data Records - BAAP Production Well No. 2	Vol. 3
APPENDIX H -	HYDROGEOLOGIC DATA	Vol. 3
	H.1 Recharge Estimates	Vol. 3
	H.2 Gradient Calculations	Vol. 3
	H.3 Velocity Calculations	Vol. 3
	H.4 Preliminary Aquifer Test Results IRM	Vol. 3
	H.5 High Capacity Well Survey	Vol. 3
	H.6 Production Well No. 4 Zone-of-Influence	Vol. 3
APPENDIX I -	HYDRAULIC CONDUCTIVITY TEST RESULTS	Vol. 3
APPENDIX J -	AQUIFER TESTING AND MODELING	Vol. 3
	J.1 Aquifer Pumping Test	Vol. 3
	J.2 Regional Groundwater Flow Model	Vol. 3
	J.3 Propellant Burning Ground Groundwater Flow Model	Vol. 3

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REMEDIAL INVESTIGATION BADGER ARMY AMMUNITION PLANT

APPENDICES

(continued)

DTIC		2
Justific	ounced cation	
By Distrib	ution/	
Α	vailabilit	y Codes
Dist	Avail a Spe	and / or cial
A-1	23	
•		Vol. 4

APPENDIX K -	CHEMICAL DATA TABLES	Vol. 4
	K.1 Flagging Codes for Chemical Data Tables	Vol. 4
	K.2 Soil Data - Surface, Subsurface, and Sediment	Vol. 4
	K.3 Surface Water Data	Vol. 4
	K.4 Groundwater Data - Round I (September 1990)	
	and Round II (October 1990)	Vol. 4
	K.5 Groundwater Data - Round One (November/	
	December 1991) and Round Two (April/May 1992)	Vol. 5
APPENDIX L -	DATA QUALITY REPORT	Vol. 6
	L.1 BAAP Production Well No. 2 Water Quality Assessment	Vol. 6
	L.2 USATHAMA-certified Analytical Methods	Vol. 6
,	L.3 Laboratory Quality Control Data	Vol. 6
	L.4 Summary of Nontarget, Library Searched Compounds	
	Detected in RI Analytical Program	Vol. 6
	L.5 USATHAMA-approved Laboratory Control Charts	Vol. 6
	L.6 ABB-ES Groundwater Screening Results	Vol. 6
	L.7 Selection of Analytical Results In the	
	Case of More Than One Analytical Method	Vol. 6
	L8 USATHAMA/USEPA Split Groundwater Samples	Vol. 6
APPENDIX M -	CALCULATIONS FOR PARAMETERS USED	
	IN RISK ASSESSMENT	Vol. 7
APPENDIX N -	IRIS FILES FOR COMPOUNDS OF POTENTIAL CONCERN	Vol. 7
APPENDIX O -	HUMAN HEALTH RISK CALCULATIONS	Vol. 7
		V 01. 7
APPENDIX P -	INVENTORY OF SITE SPECIES	Vol. 7
APPENDIX Q -	EXPOSURE PARAMETERS OF SITE SPECIES	Vol. 7
APPENDIX R -	ECOLOGICAL RISK CALCULATIONS	Vol. 7
WILDINIV V .	ECOLOGICAL RISK CALCULATIONS	V ()1. /

ABB Environmental 261 Commercial St Portland, ME 04112

APPENDIX A

LOCATION-SPECIFIC AND CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

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APPENDIX A1: SUMMARY OF FEDERAL ARARS AND GUIDANCE MATERIALS

Archeological and Historical Preservation Act, 40 CFR 6.301(c)

This law establishes procedures to provide for preservation of historical and archeological data which might be destroyed through alteration of terrain as a result of a Federal construction project or a Federally licensed activity or program. To comply with this law, a determination should be made that no historical or archeological data would be disturbed because of activity associated with remedial investigation or actions at a site.

Clean Air Act (CAA), National Ambient Air Quality Standards; 40 CFR Part 50 Part A

Site remediation activities must comply with the National Ambient Air Quality Standards (NAAQS). The most relevant pollutant standard is for particulate matter less than 10 microns in size (PM₁₀) outlined in 40 CFR Section 50.6. The PM₁₀ standard for a 24-hour period is 150 micrograms per cubic meter (μ g/m³) of air, not to be exceeded more than once a year. The PM₁₀ standard is based on the detrimental effects of particulate matter to the lungs. Remedial construction activities such as excavation will need to ensure compliance with the PM₁₀ standard. NAAQS for the six criteria pollutants are listed below:

	National Ambient Air Quality Standards
Criteria Pollutant	Standards
Carbon Monoxide	Maximum 1-hr concentration not to be exceeded more than once per year - 35 ppm Maximum 8-hr concentration not to be exceeded more than
	once per year - 9 ppm
Lead	Maximum quarterly arithmetic mean - 1.5 μg/m ³
Nitrogen Dioxide	Annual arithmetic mean - 53 μg/m ³

	National Ambient Air Quality Standards
Criteria Pollutant	Standards
PM ₁₀	24-hr average concentration not to be exceeded more than once per year - 150 $\mu g/m^3$
	Expected annual arithmetic mean concentration - $50 \mu g/m^3$
Ozone	Daily maximum 1-hr concentration, not to be exceeded more than one day per year - 0.12 ppm
Sulfur	Annual Arithmetic Mean - 0.03 ppm Maximum 24-hr concentration not to be exceeded more than once per year - 0.14 ppm
	Secondary standard: Maximum 3-hr concentration not to be exceeded more than once per year - 0.5 ppm

The attainment and maintenance of primary and secondary standards are required to protect public health and welfare (wildlife, climate, recreation, transportation, and economic values). The principal application of these standards is during remedial activities resulting in exposures through dust and vapors. NAAQSs do not apply directly to source-specific emissions limitations. Instead, the State translates the emission limitations into source-specific limitations through State Implementation Plans (SIPs), discussed in 40 CFR Part 52, Subpart YY - Wisconsin.

CAA, Prevention of Significant Deterioration Requirements; 40 CFR Part 52.21

This regulation established requirements for "major sources" of emissions in air control attainment areas (as opposed to non-attainment areas). Major sources for attainment are defined as a source which either emits 250 tons/year (tpy) of any regulated pollutant, or if the site has facility, such as an incinerator or chemical processing plant, which emits 100 or more tpy of a regulated pollutant. Attainment areas are those regions of the country that are designated as being in compliance with the NAAQS priority pollutants. Air emission requirements may vary depending upon whether the area in which the source is located is an attainment or a non-

attainment area. Non-attainment areas are those parts of the country where compliance has not been attained for one or several criteria pollutants. Sauk county, in which Badger Army Ammunition Plant (BAAP) is located, is designated as an attainment area for all regulated air pollutants.

Because of the location of the facility within an attainment area, Prevention of Significant Deterioration (PSD) regulations apply. The PSD regulations classify PSD areas as either Class I, Class II, or Class III. The classification of a particular area within a state is established within the SIP. Significant deterioration is said to occur when the amount of the new pollution exceeds the maximum allowable increment for the applicable class. The allowable increments are listed in the table below.

ALLOWABLE PSD INCREMENTS (micrograms per cubic meter)

	Class I	Class II	Class III
Sulfur Dioxide			
annual	2	20	40
24-hour	5	91	182
3-hour	. 25	512	700
Total Suspended	•		
Particulate Matter (TS	P)		
annual	5	19	37
24-hour	10	37	75

The PSD requirements are implemented through a pre-construction review process. The review process requires that affected sources comply with NAAQS and that an emission limit that reflects the installation and operation of Best Available Control Technology (BACT) is established. PSD permit regulations also require an ambient impact analysis to demonstrate the impact of the new source or modification on compliance with the NAAQS. It may be possible to demonstrate compliance by showing that impacts on air quality of the proposed source are below the significant ambient concentrations established by USEPA and shown in the following table, adapted from 40 CFR Part 52.21(i)(8)(i).

SIGNIFICANT AMBI	ENT CONCENTRATIONS
Pollutant	Concentration (micrograms per cubic meter)
Carbon Monoxide	575 (8-hour average)
Nitrogen Dioxide	14 (annual average)
Particulate Matter	10 TSP (24-hour average) 10 PM ₁₀ (24-hour average)
Sulfur Dioxide	13 (24-hour average)
Lead	0.1 (3-month average)
Mercury	0.25 (24-month average)
Beryllium	0.001 (24-hour average)
Fluorides	0.25 (24-month average)
Vinyl Chloride	15 (24-hour average)
Total Reduced Sulfur	10 (1-hour average)
Hydrogen Sulfide	0.2 (1-hour average)
Reduced Sulfur Compounds	10 (1-hour average)

CAA, State Implementation Plans; 40 CFR Part 52, Subpart YY - Wisconsin

The SIP for Wisconsin implements requirements established by the CAA. The Wisconsin SIP is composed of citations of the State air regulations, which are at least as stringent as the CAA requirements. The SIP also divides the state into Air Quality Control Regions and assigns PSD classifications for each region. The SIP is both Federally enforceable and a potential Federal Applicable or Relevant and Appropriate Requirement (ARAR).

CAA, New Source Performance Standards; 40 CFR Part 60

This regulation establishes new source performance standards (NSPS) as follows:

New Source	Standards
Incineration	Particulate emissions shall be less than 0.08 grains per dry standard cubic foot corrected to 12% carbon dioxide.
Statutory Gas Turbines	Standard for NO _x emission. SO ₂ emissions shall be less than 0.015% by volume at 15% oxygen and on a dry basis.
Storage of Petroleum Liquids	Floating roof, vapor recovery system, or equivalent are required

The NSPSs limit the emissions of a number of different pollutants, including the six criteria pollutants as well as fluorides, sulfuric acid mist, and total reduced sulfur (including H_2S).

Because NSPS are source-specific requirements, they are not generally considered applicable to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) cleanup actions. However, an NSPS may be applicable if the facility at a CERCLA site is a new source subject to an NSPS, such as an incinerator; or a relevant and appropriate ARAR if the pollutant emitted and the technology employed during the cleanup action are sufficiently similar to the pollutant and source category regulated by an NSPS.

CAA, National Emission Standards for Hazardous Air Pollutants (NESHAP); 40 CFR Part 61

This regulation establishes emission levels for certain hazardous air pollutants. NESHAPs are not generally applicable to Superfund remedial activities because CERCLA sites do not usually contain any of the specific source categories regulated. NESHAPs are also not generally relevant and appropriate because the standards of control are intended for the specific type of source regulated. Part of a NESHAP

may be relevant and appropriate if a component of a particular alternative falls into a regulated category (i.e., the NESHAP for an manufacturing air stripper for a particular contaminant may be relevant and appropriate for an air stripper as a component of a cleanup alternative.

Clean Air Act Amendments (CAAAs) of 1990: The CAA Amendments of 1990 established the requirement to promulgate new emissions standards for sources of 189 listed hazardous air pollutants (HAPs). These standards must reflect the maximum achievable control technology (MACT) considering cost, energy requirements and other impacts. MACT standards for each of the listed categories will be issued progressively within 10 years. The categories to be regulated will include a category referred to as "Waste Treatment and Disposal". Standards for the waste treatment and disposal category are scheduled for November 15, 1994.

The CAAAs establish a threshold for sources to be regulated under the air toxics program. For this purpose, a major source is defined as a source with the <u>potential</u> to emit greater than 10 tpy of any one of the listed HAPs, or greater than 25 tpy of any combination of listed HAPS, assuming operation of the facility at maximum capacity for 24 hours per day, 365 days per year. Major sources are then subject to the permitting requirements established in the CAAAs.

Clean Water Act (CWA)

The Clean Water Act was enacted to restore and maintain the quality of surface waters. The CWA regulations that are most likely to be ARARs for Superfund actions are the requirements for:

- Surface water quality, (Quality Criteria for Water)
- Direct discharges to surface waters, (National Pollutant Discharge Elimination System);
- Indirect discharges to publicly-owned treatment works, (National Pretreatment Program);
- Discharges of dredge-and-fill materials to surface waters, (Guidelines for Specification of Disposal Sites for Dredged or Fill Material).

Each of these regulations, in addition to the regulations governing discharge of radioactive pollutants to surface waters and oil pollution control are discussed in the following paragraphs. There are three categories of pollutants regulated under the various parts of the CWA listed below:

- Toxic pollutants identified in CWA Section 307(a)(1);
- <u>Conventional pollutants</u> including biochemical oxygen demand (BOD), total suspended solids (TSS), fecal coliform, oil and grease, and pH (CWA Section 304(a)(4); and
- <u>Nonconventional pollutants</u> which are defined as any pollutant not identified as either conventional or toxic in accordance with 40 CFR 122.21(1)(2).

CWA, Ambient Water Quality Criteria; 40 CFR Part 131

Federal Ambient Water Quality Criteria (AWQC) under the Clean Water Act are non-enforceable guidance established by the U.S. Environmental Protection Agency (USEPA) for evaluating toxic effects on human health and aquatic organisms. AWQC are used or considered by the States in setting their water quality standards.

AWQC may be potential relevant and appropriate ARARs for groundwater in instances where Maximum Contaminant Levels (MCLs) or Maximum Contaminant Level Goals (MCLGs) are not sufficiently stringent to be protective of the environment. In instances where the contaminants present an environmental concern, the MCLs and MCLGs should be compared, and the more stringent should be considered as the potential relevant and appropriate requirement for the site. However, while it is possible to derive cleanup levels for drinking water from AWQC, these values are not intended to be used as drinking-water cleanup standards, since no criteria are provided human exposure from ingestion of water alone. Carcinogens, which have a AWQC of zero, are not considered relevant and appropriate because they cannot be measured. This policy is consistent with the zero value for MCLGs under the Safe Drinking Water Act (SDWA). AWQC for non-carcinogens are generally set above zero, and address chronic and toxic effects. Table A-1 lists the AWQC published for two human exposure scenarios as well as acute and chronic toxicity for fresh water aquatic life.

TABLE A-1 CHEMICAL SPECIFIC STANDANDS AND GUIDANCE

REMEDIAL INVESTIGATION BADGER ARMY AMMUNITONS PLANT

CHEMICAL CHEMICAL CODE CHEMICAL NAME ACRYLO ACRYLO ALK Alt	LL NAME	SAFE DIMERING WATER ACT (SDWA) (d) MCL (wg/l) (a) S0-200 (1) S0-200 (1)	MCLG (Mg/l)	FOR PROTECTION OF HUMAN	OF HUMAN FIRSH CONSUMETION ONLY (Jugh) 0.65	FOR PROTECTION FREHWATEN ADJIT/CHRONG	For Protection of Aquatic Life	WI PUBLIC HEALTH GROUNDWATER QUALITY STANDARDS (b)	MOUNDWATE	R QUALITY STANDA	3
3	11 NAME	MCL (ug/l) (a) 50-200 (1)	MCLG Great	WATER AND FISH CONSUMPTION (Jug/l) 0.056 (2) 0.0022	Fiest ConsumerTon ONLY (Ung/l) 0.65	FREHWATER			AMDR		
3	L NAME	MCL (Jug/l) (e.) 50-200 (1)	Great	Constant Ton (PgA) 0.056 (2) (2) (3) (3)	(Appl) (5)	ACUTE/CHRONIC	MARKE	CUMBIT STANDANDS		PROPOSED STANDARDS	DARDS
	(A)	50 (3)		(2) (2) 0.0022 15,000	0.65	(MBW)	ACUTE/CHRONIC (µg/l)	ENFONCEMENT STANDANDS (PQA)	PAL	EMFONCEMENT STANDANDS (JugA)	PAL (vod)
	henyd	50-200 (1)		0.0022	8	7,500/2,600 (10)	4	٠	·		
	hexyt)	50 (3)		0.0022		(2)	(2)	•	·		·
	nexyt)	50 (3)	. 6	0.0022		wdd 02∕ -	-/-	•		,	·
	vexyl)		•	15,000	0.0175	+	4	OS.	S	,	
		€ *			20,000	400/300 (4)	400/360 (4)	3	0.3		,
1		2,000	2,000	1,000	,	4.	.}-	1,000	300	2,000	904
C2H3CL vinyl chloride	2	2	o	2	525	+	+	0.2	0.0015		0.02
\vdash		s	•	99:0	40	5,300/- (5)	5,100/700 (5)	5	0.067		20
		,		•	,	+	+	•			
	schloride	s	•	₽:0	6.94	35,200/- (5)	(2) -/000'05	s	0.5	,	
		s	s	ξ.		3.9/1.1 (4)	43/9.3	10	-	5	0.5
5		100 (6)		0.19	15.7	26,900/1,240(5)	4.	g	9.0		
		250,000 (7)		•		980,000/230,000	+	250,000 (7)	125,000		
CO					•	4	÷				
	(total)	100	100	,		÷	+	S	8	100	2
CS2 carbon disuffide	uffde	•	٠			4	+				
12DCLE 1,2-dichloroethane	oethane	5	0	0.94	243	118,000/20,000 (5)	11,300/- (5)	S	60.0		0.5
DEP dethytphthalate	slate	٠	•	350,000	1,900,000	4	÷				
DNBP di-n-butyl phithalate	withalate			34,000	154,000	4.	<i>j.</i>				

TABLE A-1 CHEMICAL SPECIFIC STANDANDS AND GUIDANCE

REMEDIAL INVESTIGATION BADGER ARMY AMBURITIONS PLANT

					CWA WATER OR	CWA WATER QUALITY CRITERIA (c)					
	CHEMOAL	SAFE DIMINING WATER ACT (SDWA) (d)	WATER ACT] {d}	FOR PROTECTION C	Protection of Human Health	FOR PROTECTION	FOR PROTECTION OF AGUATIC LEE	WI PUBLIC HEALTH GROUNDWATTH CHALITY STANDANDS (b)	MOUNDWATH	BI QUALITY STANDA	(q) s Qr
				WATER AND FISH	FIRM	FREMMATER	MANNE	CUMBIT STANDANDS	ANDS	Phoroged Standands	DAMDS
CHEMICAL	CHEMICAL NAME	MCL (ug/l) (a)	MCLG (vg/l)	COMBUNITION (Jug/l)	ONLY (Jug/l)	Acutaichmana (ug/l)	ACUTE/CHRONIC (vg/l)	ENFONCEMENT STANDANDS (VBA)	PAL	ENFONCEMENT STANDANDS (Wg/l)	PAL
DMOP	d-n-octyl phthalate	·	٠	•		4	+		٠		
24DNT	2,4-dinitrotoluene	•		0.11	9.1	330/230 (5)	+	50:0	0.005		
26DNT	2,6-dintrototuene		٠	•	•	+	4-	0.05	0.00\$		
FANT	fluoroanthene	٠	٠	42	54	3,960/- (5)	40/16 (5)	•	•		
Ħ	tron	300 (1)	•	300		11.	4	300 (7)	150 (7)		
HARD	hardness	•	·	•		+	+			٠	
₩	mercury	2	2	0.144	0.146	2.4/0.012	2.1/0.025	2	0.2		
MECSHS	toluene	1,000	1,000	14,300	424,000	17,500/- (5)	6,300/5000 (5)	343	9.69	(8)	20 (8)
MEK	2-butanone	٠	٠	٠	•	+	4-	460	06		
MN	manganese	50 (1)	200 (4)	20	100	+	4.	50 (7)	25 (7)		
2MNAP	2-methymaphthalene	٠	•	•	•	+	+-		•		
NA NA	sodium	(6)	٠	•	•	4-	+		·		
2NAN#L	2-nitroeniline		•	,	•	+	+				,
3NANIL.	3-ntroantine	٠	•	,		+	4.				
4NAML	4-nitroeniline		•	•	•	+	+	•	,		
NAP	nephthalene			•	•	2,300/620 (5)	2,350/-	40	9		
NB NB	ntrobenzene	•	•	19,800		27,000/- (5)	6,600/- (5)				
NG	nitroglycerine			•	•	4	+				

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TABLE A-1 CHEMICAL BPECIFIC STANDAINDS AND GUIDANCE

REMEDIAL INVESTIGATION BADGER ARMY AMMUNITHONS PLANT

					CWA WATER OL	CWA WATER QUALITY CRITERIA (c)					
	CHEMICAL	SAFE DRINKING WATER ACT (SDWA) (d)	WATER ACT) (d)	FOR PROTECTION (PROTECTION OF HUMAN HEALTH	FOR PROTECTION	FOR PROTECTION OF AGUATIC LEE	WI PUBLIC HEALTH GROUNDWATER QUALITY STANDARDS (b)	INCUNDAVA TE	R QUALITY STANDA	(q) sov
				WATER AND FIRM	FIRM	FRESHWATER	Bervy	CUMBIT STANDARDS	ANDS	PROPOSED STANDARDS	DANDS
CODE	CHEMICAL MAME	MCL (vg/l) (a)	MCLG (vg/l)	CONSUMETION (ug/l)	ONLY (wg/l)	Acuta/Ciencies (wg/l)	Acute/Chaosec (ug/l)	ENFONCEMENT STANDANDS (AgA)	(VŠd) byt	EMPONDENTER STANDANDS (MgA)	PAL
Z	nickel	100	100	13.4	100	1,400/160 (10)	75,0.3		٠	•	
Ę	ritrite/nitrate- nonspecific	10,000 (11)	10,000 (11)		•	+	+	10,000	2,000	·	
NNOPA	n-nitros diphenylamine	•	•	(12)	(21)	+	+	•		•	
NO2	ritrite	1,000	1,000	•	•	+	+	•		1000	200
MO3	ritrate	10,000	10,000	10,000	•	+	4-		٠	10,000	2,000
2	lead	П (3)	0	90	•	63/3.2 (10)	220/8.5	90	3	15	1.5
3 5	selenium	20	8	10	•	0.02/0.005	0.3/0.071	10	1	05	10
SO4	suffate	250,000 (1) 400/500 (4)	400/500 (4)		•	+	+	220,000 (7)	125,000 (7)	•	
111TCE	1,1,1-trichloroethane	300	200	18400	1,030,000	+	31,200/- (5)	200	0#	•	
112TCE	1,1,2-trichloroethane	5	3	0.6	41.0	-/9,400 (5)	4.	9.0	90:0	•	
2 01	· total dissolved solids	500,000 (14)	•		•	4-	4.	•	•		
236TMN	2,3,6- trimethyinapthalene	•	·			+	+	•	·		
TRCLE	trichloroethylene	9	0	2.7	60.7	45,000/21,000 (5)	2,000/- (5)	s	0.18	·	0.5

A-10



TABLE A-1 CHEMICAL SPECIFIC STANDANDS AND GUIDANCE

REMEDIAL INVESTIGATION BADGES AMAY AMMUNITONE PLANT

					CWA WATER OU	CWA WATER QUALITY CRITERIA (e)					
-	CHEMICAL	SAFE DIMERING WATER ACT (SDWA) (d)	WATER ACT	FOR PROTECTION (PROTECTION OF HUMAN HEALTH	FOR PROTECTION	FOR PROTECTION OF AGUATIC LIFE	WI PUBLIC HEALTH GROUNDWATER CHALITY STANDANDS (b)	ROUNDWATE	R GLALITY STANDA	(4) sq
				WATER AND FIRM	FISH	FREHWATER	MARWE	CUMENT STANDANDS	AFDS	PROPOSED STANDANDS	DAMDS
CODE	CHEMICAL NAME	MCL (mg/l) (a)	MCLG	CONSUMPTION (LVGA)	(MEA)	Acute/CHROMO (vg/l)	Acute/Chronic (rg/l)	EMFONCEMENT STANDANDS (URA))	PAL (ven)	ENFONCEMENT STANDANDS (µg/l)	PAL Selvi
3,5	Zhc	5000 (1)	·		·	102/110 (10)	85/86 (10)	5,000 (7)	2,500 (7)		
Sources:						(c) EPA,	1991. "Water Quality Crite	EPA, 1991. "Water Quality Criteria Summary"; Office of Science and Technology, Health and Ecological	dence and Tech	hnology, Health and Economic Mashind	ological on O.C.
e e	U.S. Environmental Protection Agency (EPA), 1991, "Fact Sheet: National Primary Orthking Water Standards". Office of Water, Washington, D.C. August, 1991; EPA, 1991, "Fact Sheet: National Secrotiary Drinking Water Standards", Office of Water, Washington, D.C., September, 1991; and EPA, 1990, "National Primary and Secondary Drivking Water Regulations; Synthetic Organic Chemicals and Incry gard. Chemicals and Mace. "Final Rule", 178718, July 17, 1992. Wisconsin Administrative Code, Chapter NR 140.10, Table 1.	ction Agency (EPA), ater, Washington, D.: r Standards", Office of and Secondary Drinkli if Rufe", 57FR31778, J Code, Chapter NR 14	C. August, 1997 of Water, Washin ng Water Regular Nay 17, 1992.	neet: National Primary [1; EPA, 1991, "Fact St gron, D.C., September, I tions; Synthetic Organic	Drinking Water heet: National 1991; and EPA, Chemicals and	(d) EPA (Cheena Uwadon, Ecological rest May 1, 1981. EPA SOWA National Primary Dr	Chlerin DARION, ECONODICA 1954 ASSESSMEN CHIRAL, FARMER 1955 ASSESSMENT BOARD 1, 1991. May 1, 1991. EPA SDWA National Primary Drinking Water Regulations per 40 CFR 141: MCLs and MCLGs.	per 40 CFR 141	: MCLs and MCLGs.	
						NCS (R proposes to delete to	MINN exconses to delete tokene from regulation as a public health water quality standard and to	public health	water quality standard	and to
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A-11

In the absence of any Wisconsin Surface Water Quality Standard (FWQS) specific to the pollutant and water body of concern, AWQC may be ARARs for surface-water bodies when protection of aquatic life is a concern or if human exposure from consumption of contaminated fish is a concern.

CWA, 40 CFR Part 122, 125 - National Pollutant Discharge Elimination System (NPDES)

The CWA controls the direct discharge of pollutants to surface water thro ne NPDES program. NPDES requires permits for direct discharges to surface or rs. The permits contain limits based on either effluent standards or AWQC if they are more stringent. An on-site discharge from a CERCLA site to surface waters must meet the substantive NPDES requirements, but need not obtain an NPDES permit to comply with the administrative requirements of the permitting process, consistent with CERCLA section 121(e)(1). On the other hand, an off-site discharge from a CERCLA site to surface waters is required to obtain an NPDES permit and to meet both the substantive and administrative NPDES requirements. Examples of direct discharges include:

- On-site waste treatment whereby wastewater (which may include contaminated groundwater which is pumped, treated, and discharged to surface water), is discharged into or very close to a surface-water body through a discernable conveyance such as a pipe, ditch, channel, tunnel, or well.
- <u>Off-site treatment</u> whereby wastewater is discharged by a discernable conveyance to an off-site surface water body.
- Any remedial action where site runoff is channeled directly to a surface-water body through a ditch, culvert, storm sewer, or other means.
- <u>Unchanneled runoff</u> from a site into surface water.

CWA, 40 CFR Part 403, Section 307 (b) - National Pretreatment Program

If a groundwater treatment system is installed at the site and the discharge is to be sent to a publicly owned treatment works (POTW), then pretreatment standards

under the federal CWA apply. CWA Section 307(b) authorized the National Pretreatment Program to regulate the introduction of pollutants from nondomestic sources into POTWs. The goal of the program is to prevent discharges into POTWs that (1) will interfere with the operation of a POTW, including interferences with sludge use or disposal; (2) will pass through the POTW; or (3) will be otherwise incompatible with the POTW. The National Pretreatment Program consists of the following interacting elements:

- national categorical standards
- prohibited discharge standards
- local limitations

Because the national categorical standards provide limits on discharges from particular industries, they are not applicable to the site. The prohibited discharge standards consist of general prohibitions, specific prohibitions, and local limitations, and are discussed in the following subsections.

General Prohibitions

General prohibitions of pretreatment regulations (40 CFR Section 403.5(a)) are intended to control the introduction of certain contaminants into POTWs to (1) prevent interference with POTW operation, (2) prevent passage of contaminants through the POTW, and (3) improve opportunities to recycle and reclaim municipal and industrial wastewater and sludge.

Specific Prohibitions

Specific prohibitions of the National Pretreatment Program (40 CFR Section 403.5(6)) are intended to protect against discharges that cause (1) fire or explosion hazards, (2) corrosive structural damage to a POTW, (3) obstruction of flow into a sewer system, (4) interference due to a pollutant's high concentration, or (5) a temperature increase that would inhibit biological activity at a POTW.

Local Limitations

Local limitations are specific requirements developed and enforced by POTWs. POTWs develop limitations to meet state and local regulations in conjunction with general and specific prohibitions. These limitations should be periodically reviewed

and revised to respond to changes in federal or state regulations or criteria, or plant operations at the POTW. For POTWs to develop local limitations, the statutory and regulatory requirements of the CWA and General Pretreatment Regulations and state and local requirements must be addressed.

Ouality Criteria for Water: 40 CFR Part 131

AWQC are non-enforceable, health-based criteria developed for 95 carcinogenic and noncarcinogenic compounds. AWQC were developed under CWA Section 304 and are used by the state, in conjunction with a designated use for the surface water body, to establish water quality standards under CWA Section 303. AWQC provide levels of exposure from drinking the water and consuming aquatic life which are protective of public health. AWQC also provide acute and chronic concentrations for protection of freshwater and marine organisms. AWQC for non-carcinogens are generally set above zero, and address chronic and toxic effects. AWQC for carcinogens are recommended at zero. Table A-1 lists the AWQC published for two human exposure scenarios as well as acute and chronic toxicity for fresh water aquatic life.

Remedial actions involving contaminated surface water or groundwater must consider water uses and the circumstances of the release or threatened release. If a groundwater treatment system is installed at the site and the discharge from this system is sent to an on-site surface water body, the federal AWQC must be attained when relevant and appropriate under the circumstances of the release or the threatened release. Because compliance with AWQC is not legally required at non-Superfund site, and they are not legally applicable requirements under CERCLA.

In the absence of any FWQS specific to the pollutant and water body of concern, AWQC may be ARARs for surface-water bodies when protection of aquatic life is a concern or if human exposure from consumption of contaminated fish is a concern. When protection of aquatic life is a concern, the AWQC for fresh or saltwater aquatic life may be ARARs. When human exposure from consumption of contaminated fish is a concern, the AWQC for human exposure from consumption of fish may be ARARs for the site. AWQC are rarely determined to be ARARs for surface water or groundwater determined to be a potential current or future source of potable water. However, if contamination of a potential potable water source also presents an environmental concern, the stringency of AWQC may be compared to non-zero MCLs or MCLGs, and the more stringent of the two may be the relevant and appropriate requirement for the site.

Again, AWQC may be potential relevant and appropriate ARARs for groundwater in instances where MCLs or MCLGs are not sufficiently stringent to be protective of the environment. In instances where the contaminants present an environmental concern, the MCLs and MCLGs should be compared, and the more stringent should be considered as the potential relevant and appropriate requirement for the site. However, while it is possible to derive cleanup levels for drinking water from AWQC, these values are not intended to be used as drinking-water cleanup standards, because no criteria are provided for human exposure from ingestion of water alone. Carcinogens, which have a AWQC of zero, are not considered relevant and appropriate because they cannot be measured. This policy is consistent with the zero value for MCLGs under the SDWA.

CWA, 40 CFR Part 230 - Guidelines for Specification of Disposal Sites for Dredged or Fill Materials

The CWA regulates the discharge of dredged or fill material into U.S. waters, including wetlands. The U.S. Army Corps of Engineers (USACE) defines wetlands as those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support and, that under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions. The purpose of Section 404 is to ensure that proposed discharges are evaluated with respect to impact on the aquatic ecosystem. The act of excavation and/or dredging is not regulated under Section 404; however, the deposition of dredged or excavated materials in U.S. waters, including wetlands, is. Discharge of fill material generally includes, without limitation, placement of fill necessary for construction and site development (e.g., dams, dikes, and levees), fill associated with the creation of ponds, and any other work involving fill material discharge. If a remedial alternative involves a dredged or fill material being discharged to a wetland, the USACE permit requirements must be attained. No procedures are set forth in the regulations for the jurisdictional determination.

No procedures are set forth in the regulations for jurisdictional determination. Therefore, to determine if an area is subject to wetlands jurisdiction and permitting requirements, the closest USACE district office should be consulted. However, USACE, in conjunction with the U.S. Fish and Wildlife Service (USFWS), USEPA, and U.S. Department of Agriculture Soil Conservation Service, developed the Federal Manual for Identifying and Delineating Jurisdictional Wetlands, which presents a multi-parameter approach to field identification of federally regulated

wetlands (Department of the Army et al., 1989). For an area to meet the USACE definition of a wetland, it must contain hydrophytic vegetation and hydric soils, and have a hydrology indicative of a wetland. The size of the wetland is not a factor.

In addition, Section 404(b)(1), Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR Part 230), maintains that no dredged or fill material discharge will be permitted if there is a practicable alternative with less impact on the aquatic ecosystem. Discharge also will not be permitted unless steps are taken to minimize potential adverse impacts, or if the discharge will cause or contribute to significant degradation of U.S. waters. If a remedial alternative involves discharging dredged or fill material to a wetland, potential short- and long-term effects must be determined, based on various physical, chemical, and biological parameters. Impacts to the following areas need to be addressed: substrate, suspended particulates, turbidity, water, current patterns and water circulations, normal water fluctuations, salinity, threatened and endangered species, fish or other aquatic organisms in the food web, and other wildlife. Effects on human use characteristics (e.g., aesthetics and recreation) also need to be addressed.

CWA, 40 CFR Part 112 - Oil Pollution Control

Under these regulations, on shore and offshore oil storage facilities that could potentially spill oil into navigable U.S. waters or onto adjoining shorelines are required to prepare and implement a Spill Prevention, Control, and Countermeasure (SPCC) plan. Specifications for secondary containment and/or diversion structures, discharge systems, and leak oetection systems are outlined. Facilities that have an aggregate storage of 1,320 gallons of oil or less, provided no single container has a capacity exceeding 660 gallons, are exempt from these regulations. These requirements may be potential relevant and appropriate ARARs for sites which include underground storage tanks.

Endangered Species Act (ESA), 40 CFR Part 302 (h)

With the vast acreage of undeveloped land available, many Army installations serve as habitat for native and migratory species including threatened and endangered flora and fauna. The ESA of 1973 as amended in 1988, governs the management of these resources and requires that proposed federal action do not jeopardize the continued existence of endangered or threatened species or result in the destruction of critical

habitat. For example, if under the ESA a baseline survey identifies listed species or areas of critical concern, a biological assessment may be required to evaluate potential adverse impacts caused by a proposed action or project.

Fish and Wildlife Coordination Act, 40 CFR 302 (g)

The Fish and Wildlife Coordination Act requires that the USFWS, National Marine Fisheries Service, and other related state agencies be consulted before a body of water, including wetlands, is modified (i.e., dredged, filled, or dammed). During the development of the site Feasibility Study (FS), alternatives proposing excavation or fill in or adjacent to a wetland will be evaluated with respect to potential impacts on wetlands.

In addition, under the Sikes Act, each military department must provide for proper fish and wildlife management. Furthermore, the Act requires resource management be carried out according to a cooperative plan mutually agreed upon by the installation commander, the regional office of the U.S. Fish and Wildlife Service, and the appropriate state agency. This Act also provides for collection of hunting and fishing fees to provide habitat improvements.

Floodplain Management Exec. Order (EO) No. 11988; (40 CFR 6.302(b) and Appendix A

This executive order requires Federal agencies to evaluate the potential effects of adverse impacts to floodplains associated with direct and indirect development of a floodplain. Alternatives that involve the alteration of a floodplain may not be selected unless a determination is made that no practicable alternative exists. If no practicable alternative exists, potential harm must be minimized and action taken to restore and preserve the natural and beneficial values of the floodplain.

Hazardous Materials Transportation Act, 49 CFR Parts 171, 173, 178, 179; Hazardous Materials Transportation Regulations

This regulation outlines procedures for the packaging, labeling, manifesting, and transporting of hazardous materials. Contaminated materials would need to be

packaged, manifested, and transported to a licensed off-site disposal facility in compliance with these regulations.

Historic Sites, Buildings and Antiquities Act; 40 CFR 6.301 Hazardous Materials Transportation Act, 49 CFR Parts 171, 173, 178, 179; Hazardous Materials Transportation Regulations

This regulation outlines procedures for the packaging, labeling, manifesting, and transporting of hazardous materials. Contaminated materials would need to be packaged, manifested, and transported to a licensed off-site disposal facility in compliance with these regulations.

National Environmental Policy Act Regulations (NEPA), 40 CFR Part 6

Appendix A of NEPA sets forth policy for carrying out provisions of the Protection of Wetlands Executive Order (EO 11990). Under this order, federal agencies are required to minimize the degradation, loss, or destruction of wetlands, and to preserve and enhance natural and beneficial values of wetlands. Appendix A requires that no remedial alternative adversely affect a wetland if another practicable alternative is available. If no alternative is available, impacts from implementing the chosen alternative must be mitigated. During the site FS process, identification and evaluation of alternatives involving excavation, excavation transport, or fill in or adjacent to a wetland will address the alternative's impact on the wetland as it relates to NEPA.

Occupational Health and Safety Act (OSHA), General Industry Standards; 29 CFR Part 1910

This regulation establishes requirements for programs to assure worker health and safety at hazardous waste sites, including employee training requirements and permissible exposure limits for workplace exposure to a specific listing of chemicals. Under 40 CFR 300.38, requirements apply to all response activities under the National Contingency Plan (NCP).

Occupational Health and Safety Act, Occupational Health and Safety Regulations; 29 CFR Part 1910, Subpart Z

This subpart of 29 CFR Part 1910 establishes permissible exposure limits for workplace exposure to a specific listing of chemicals. These standards are applicable for worker exposure to OSHA hazardous chemicals during remediation activities.

OSHA, Recordkeeping, Reporting, and Related Regulations; 29 CFR Part 1904

This regulation establishes recordkeeping and reporting requirements applicable to remediation activities. These requirements apply to all site contractors and subcontractors and must be followed during all site work.

OSHA, Health and Safety Standards; 29 CFR Part 1926

This rule specifies the type of safety training, equipment, and procedures to be used during site investigation and remediation. All phases of the remedial response project should be executed in compliance with this regulation.

Protection of Wetlands EO No. 11990; 40 CFR 6.302(a) and Appendix A

This executive order requires Federal agencies to avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practical alternative exists. Alternatives that involve the alteration of a wetland may not be selected unless a determination is made that no practicable alternative exists. If no practicable alternative exists, potential harm must be minimized and action taken to restore and preserve the natural and beneficial values of the wetland.

Resource Conservation and Recovery Act (RCRA), Hazardous Waste Management System; (40 CFR Part 260)

This rule sets forth procedures that USEPA will use to make information available to the public, and sets forth rules that transfer storage and disposal facilities (TSDF) must follow to assert claims of business confidentiality with respect to information

submitted to USEPA pursuant 40 CFR Parts 261-265. This rule creates no substantive clean-up requirements.

RCRA, 40 CFR Part 261, 261.1-261.33 - Identification and Listing of Hazardous Waste

This rule defines those solid wastes which are subject to regulation as hazardous wastes under 40 CFR Parts 262-265. The applicability of RCRA regulations to wastes found at the site is dependent on the solid waste meeting one of the following criteria:

- The wastes are generated through a RCRA listed source process;
- The wastes are RCRA listed waste from non-specific source; or
- The waste is characteristically hazardous due to ignitability, corrositivity, reactivity or toxicity.

RCRA, 40 CFR Part 262, Subparts A - D, 262.10-262.44 - Standards Applicable to Generators of Hazardous Waste

These rules establish standards for generators of hazardous wastes that address: accumulating waste, preparing hazardous waste for shipment, and, preparing the uniform hazardous waste manifest. These requirements are integrated with Department of Transportation (DOT) regulations. If an alternative involves the offsite transportation of hazardous wastes, the material must be shipped in proper containers that are accurately marked and labeled, and the transporter must display proper placards. These rules specify that all hazardous waste shipments must be accompanied by an appropriate manifest.

RCRA, 40 CFR Part 263 Subparts A - C, 263.10-263.31 - Standards Applicable to Transporters of Hazardous Waste

This rule establishes procedures for transporters of hazardous waste within the U.S. if the transportation requires a manifest under 40 CFR Part 262. If an alternative involves off-site transportation of hazardous waste for treatment and/or disposal, transporters must meet these requirements.

RCRA, 40 CFR - Part 264 Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

This rule establishes minimum national standards which define the acceptable management of hazardous wastes for owners and operators of facilities which treat, store or dispose of hazardous wastes. Should remedial actions involve management of RCRA wastes at an off-site TSDF or if a treatment facility is constructed on-site, tnese requirements would by applicable.

RCRA, 40 CFR Subpart B, 264.10-264.18 - General Facility Standards

These general facility requirements outline general waste analysis, security measures, inspections, and training requirements. Section 264.18 establishes that a hazardous waste facility located in a 100-year floodplain be designed, constructed, operated, and maintained to prevent washout of hazardous wastes during a 100-year flood. An exception is if it can be demonstrated that current procedures can facilitate the safe removal of waste (before floodwaters would reach the facility) to a location where waste is not vulnerable to floodwaters. Should remedial actions involve management of RCRA wastes at an off-site TSDF, if a treatment facility is constructed on-site, or if the 100-year floodplain may be impacted, these requirements may be potential relevant and appropriate ARARs.

RCRA, 40 CFR Subpart C, 264.30-264.37 - Preparedness and Prevention

This regulation outlines requirements for safety equipment and spill-control for hazardous waste facilities. Facilities must be designed, maintained, constructed, and operated to minimize the possibility of an unplanned release that could threaten human health or the environment. Safety and communication equipment should be incorporated into all aspects of the remedial process and local authorities should be familiarized with site operations.

RCRA, 40 CFR Subpart D, 264.30-264.37 - Contingency Plan and Emergency Procedures

This regulation outlines the requirements for emergency procedures to be used following explosions, fires, and other emergency events. These requirements are

relevant and appropriate for remedial actions involving the management of hazardous waste.

RCRA, 40 CFR Subpart E, 264.70,72-77 - Manifest System, Recordkeeping, and Reporting

This rule outlines procedures for manifesting hazardous waste for owners and operators of on-site and off-site facilities that treat, store, or dispose of hazardous waste. These regulations apply if a remedial alternative involves the treatment, storage, or disposal of hazardous waste off-site. For on-site treatment/disposal, these regulations are applicable in order to properly document disposition of RCRA wastes.

RCRA, 40 CFR Sections 264.90-264.101, Subpart F - Releases from Solid Waste Management Units

The RCRA concentration limits (40 CFR Section 264.94) are potentially applicable and establish three categories of groundwater protection standards: background concentrations, RCRA MCLs, and Alternate Concentration Limits (ACLs). RCRA MCLs consist of a subset of SDWA MCLs; therefore, in complying with SDWA MCLs, clean-up will be consistent with RCRA MCLs. If no MCL exists, a background level or a health-based (i.e., assuming human exposure) ACL may be developed on a case-by-case basis as a groundwater protection standard. ACLs are based on the contaminant level's potential adverse effects on groundwater quality and on hydraulically connected surface waters, considering factors such as (1) physical and chemical characteristics of the waste, (2) hydrogeological characteristics of the setting, (3) groundwater flow quantity and direction, (4) current and future groundwater uses, (5) existing quality of area groundwater, and (6) persistence and permanence of adverse effects. Additional factors are listed in 40 CFR Section 264.94. This rule is relevant and appropriate for cleanup of groundwater contamination at facilities holding a RCRA Part B permit for the treatment, storage, and disposal of hazardous waste.

A-22

RCRA, 40 CFR Subpart G, 264.110-264.120 - Closure and Post-Closure

This regulation details general requirements for closure and post-closure of hazardous waste facilities, including installation of a groundwater monitoring program. This rule is a potential relevant and appropriate ARAR for remedial alternatives that involve the closure of a hazardous waste site. If a RCRA Part B permitted site is in the process of closure and post-closure of SWMUs, this regulation would be applicable.

RCRA, 40 CFR Subpart I, 264.170-264.178 - Use and Management of Containers

This requirement defines standards for the containerized storage of hazardous waste. This requirement would apply if a remedial alternative involves the storage of containers filled with hazardous waste. Additionally, the staging of study-generated RCRA-wastes should meet the intent of the regulation.

RCRA, 40 CFR Part 264.190-264.199, Subpart J - Tank Systems

These regulations outline design standards and leak detection measures for aboveground an underground storage tanks used for storing or treating hazardous waste. These regulations include requirements for assessing existing tank systems, design and installation of new tank systems, containment and detection of release, general operations, inspections, response to leaks or spills, and closure and post-closure care. These requirements must be considered underground storage tanks, and, if applicable, complied with during implementation of remedial activities

RCRA, 40 CFR Subpart K, 264.220-264.231 - Surface Impoundments

There are three basic closure options for surface impoundments. The clean-closure option requires removal or decontamination for all hazardous constituents; it includes very stringent groundwater standards for clean-up levels. If all hazardous constituents will not be removed or decontaminated, the landfill closure option may be used. Landfill closure is a containment option and requires a final cover or cap and a post-closure plan that protects human health and the environment.

Should a remedial action involve the placement of hazardous wastes in surface impoundments (e.g., lagoons for the treatment and/or storage of extracted water/groundwater), this regulation would be relevant and appropriate.

RCRA, 40 CFR Part 264, Subpart L, Waste Piles

This rule establishes procedures and operating requirements for both closure and post-closure of waste piles. If removal or decontamination of all contaminated subsoils is not possible, closure and post-closure requirements for landfills must be attained. Should a remedial action involve the placement of hazardous wastes in surface impoundments (e.g. lagoons for the treatment and/or storage of extracted water/groundwater), this regulation would be relevant and appropriate. According to RCRA, waste piles used for treatment or storage of non-containerized accumulation of solid, non-flowing hazardous waste may comply with either the waste pile or landfill requirements. The temporary storage or treatment of hazardous waste on-site, therefore, should meet the substantive requirements of one or the other subpart.

RCRA, 40 CFR Part 264, Subpart M - Land Treatment

This rule details procedures, design, and operating requirements, monitoring requirements, recordkeeping, and closure and post closure requirements for land treatment units. Any facility employed in the treatment of hazardous waste should meet the substantive construction, monitoring, operational, and closure standards established within this regulation.

RCRA, 40 CFR Sections 264.300-264.317, Subpart N - Landfills

This regulation covers design and operating requirements, and closure and postclosure options for hazardous waste landfills. These requirements must be considered and complied with during the development and implementation of remedial alternatives for the site landfills to contain hazardous waste. If closure is implemented as a remedial action, a final cover must be designed and constructed that prevents migration of liquids, requires minimum maintenance, promotes drainage, minimizes erosion, accommodates settling, and has a permeability less than or equal to that of any bottom liner or natural subsoils present.

RCRA, 40 CFR Subpart O, 264.340-264.599 - Incinerators

This regulation specifies the performance standards, operating requirements and monitoring, inspection, and closure guidelines of any incinerator burning hazardous waste. These requirements are applicable for the off-site incineration of RCRA-regulated wastes. For alternatives employing on-site thermal treatment (i.e., incineration) of RCRA wastes should comply with the requirements specified in this subpart of RCRA.

RCRA, 40 CFR Subpart X, 264.600-264.999 - Miscellaneous Units

These standards are applicable to miscellaneous units not previously defined under existing RCRA regulations. Subpart X outlines performance requirements that miscellaneous units be designed, constructed, operated, and maintained to prevent releases to the subsurface, groundwater, and wetlands that may have adverse effects on human health and the environment. The design of proposed treatment alternatives, not specifically regulated under other subparts of RCRA, must prevent the release of hazardous constituents and must prevent future impacts on the environment.

RCRA, 40 CFR Part 266 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities

Part 266 deals with both recycling/reuse activities and types of wastes being recycled or reused. Five types of recycling/reuse are included:

- Subpart C Applies to materials that in the process of being recycled are applied. These materials can be referred to as "use constituting disposal". The regulatory requirements for these actions are very similar to the requirements for land disposal.
- Subpart E Applies to used oil burned for energy recovery. The substantive requirements apply only to used oil that exceeds specified limits for heavy metals, flash point, and total halogens.
- Subpart F Applies to precious metal wastes that are processed for metal recovery. These requirements are administrative only.

- Subpart G Applies to spent lead-acid batteries that are being reclaimed. Only storage facilities for spent lead-acid batteries are regulated under this subpart.
- Subpart H Applies to hazardous wastes that are burned in boilers and industrial furnaces. Permitting requirements, emission standards, minimum storage requirements, record keeping, and operating requirements are established for this activity.

RCRA, 40 CFR Part 268 - Land Disposal Regulations (LDRs)

This regulation details procedures, design and operating requirements, monitoring requirements, recordkeeping, and closure and post-closure for land treatment units. Any land treatment facility employed in the treatment of hazardous waste should meet the construction, monitoring, operational, and closure standards established within this regulation.

Land disposal of RCRA hazardous wastes without prior treatment is prohibited. Waste at specific sites must be evaluated as to whether it meets the definition of one of the specified restricted wastes and the remedial action must constitute "placement" for the land disposal restrictions to be considered applicable. For each hazardous waste, the LDRs specify that the waste must be treated either by a treatment technology or to a concentration level prior to disposal in a RCRA Subtitle C permitted facility. Under the LDRs, treatment standards have been established for all <u>listed</u> wastes. If it is determined that hazardous wastes at the site are considered subject to LDRs, the material must be handled and treated in compliance with these regulations. To date, treatment standards for hazardous soil and debris (CSD) have been proposed, but not promulgated; however, if CSD fails the Toxicity Characteristic Leaching Procedure (TCLP) test, and are thus characteristically hazardous, disposal of treated wastes in a RCRA-permitted unit would be required

RCRA, Land Disposal Restrictions for Newly Listed Wastes and Hazardous Debris, 40 CFR Parts 148, 260, 261, 262, 265, 270 and 271

Contaminated debris can now be managed so that treated, cleaned debris may be disposed as non-hazardous waste. The treatment residual of the original contaminant remains a hazardous waste and must be disposed as such. Under this new rule,

debris must be treated to the performance or design and operating standards by a specified extraction or destruction technology identified in the rule, and it cannot exhibit a characteristic of hazardous waste. Residuals generated by the treatment of hazardous debris are subject to the numerical treatment standards for the waste which contaminated the debris.

A new waste management unit, a containment building, is established as part of this rule. This new unit allows wastes to be stored for up to 90 days without meeting treatment standards. Containment buildings granted 90-day status must meet the same substantive standards as permitted and interim status units.

Containment buildings are authorized for storage of dry wastes or wastes containing "very small quantities" of free liquids. Acceptable activities within the unit include storage of hazardous waste for treatment (including recovery and recycling) or transport off-site. Design and operating standards are promulgated in the rule to ensure containment of waste that is equivalent to the containment achieved by tanks.

RCRA, 40 CFR Part 270, Hazardous Waste Permit Program

This rule establishes provisions covering basic USEPA permitting requirements. RCRA permitting requirements need to be determined on a case-by-case basis, working with all involved regulatory agencies. However, any activity involving the treatment or containment of hazardous waste is subject to these permitting requirements.

RCRA, 40 CFR Part 280 - Underground Storage Tanks (USTs)

These regulations apply to USTs used to store "regulated substances," which are substances defined in Section 101(14) of CERCLA. The regulations do not apply to hazardous waste USTs.

Each UST must be properly designated and constructed. Any portion underground and any piping that routinely contains regulated substances must be protected from corrosion, in accordance with a code of practice developed by a nationally recognized association or independent testing laboratory, as specified in the regulation. To prevent spilling and overfilling associated with product transfer to the UST, required spill and overfill prevention equipment must be used. All existing USTs must comply

with the new UST system performance standards, be upgraded, or undergo closure no later than December 22, 1998.

Additional requirements pertain to general operations (Subpart C), release detection (Subpart D), and release reporting investigation and confirmation (Subpart E). Of particular importance are the requirements under Subpart F (i.e., Release Response and Corrective Action for UST Systems Containing Petroleum of Hazardous Substances). Upon confirmation of a release, certain activities must take place, including an initial response, initial abatement measures and site check, initial site characterization, free-product removal, investigations for soil and groundwater cleanup, and a corrective action plan. To permanently close a UST, the requirements of Subpart G are applicable. The UST must be emptied and cleaned, and either removed or filled with an inert solid material. The site must be assessed for contamination at closure.

If it is determined that an UST at the site is the source of contamination and must be closed, these regulations must be attained when developing and implementing remedial alternatives.

RCRA, Hazardous and Solid Waste Amendment, 1984 (HSWA) Section 3004 (u) and (v) - Corrective Action Requirements

RCRA requirements which apply to alternatives involving off site treatment or disposal and are relevant and appropriate to on site treatment approaches include: standards for owners and operators of permitted hazardous waste facilities (i.e. preparedness and prevention, contingency plan and emergency procedures, recordkeeping and reporting, and groundwater monitoring). In addition, these alternatives should meet the intent of RCRA closure and post-closure requirements. Releases of RCRA hazardous constituents into all media, on- or off-site, are subject to the HSWA. Because the corrective action requirements are only now being developed by USEPA, CERCLA remedial actions must continue to operate within the RCRA requirements.

Rivers and Harbors Act, Section 10

Section 10 of the Rivers and Harbors Act prohibits the unauthorized obstruction or alteration of any navigable water of the United States. This law would be applicable

during any remedial activity which involved dredge-and-fill activities which could potentially affect navigable waters.

SDWA, 40 CFR Part 141 - National Drinking Water Regulations; Maximum Contaminant Level Goals

The SDWA MCLGs are ARARs for aquifers and related groundwater used as a potable water supply source. MCLGs are nonenforceable health goals established by USEPA, however, the 1990 NCP recognizes MCLGs as potential ARARs. MCLGs are used in cases in which multiple contaminants or pathways of exposure present extraordinary risks to public health. In such cases, USEPA makes a sitespecific determination of the more stringent standards. Non-zero MCLGs are considered potential relevant and appropriate ARARs for groundwater used as a current or potential source of drinking water. The NCP established that MCLGs equal to zero are not appropriate for setting cleanup levels. In those circumstances the corresponding MCL will be the potentially relevant and appropriate requirement. An example of this approach is found in determining potential ARARs for copper and lead. The MCLG for copper is set at 1300 µg/l, which is therefore the potential relevant and appropriate ARAR for copper. The MCLG for lead, on the other hand, was set at zero, which is not considered to be an "appropriate" standard for CERCLA cleanups. MCLGs are never applicable requirements at CERCLA sites because they are not enforceable. As discussed under MCLs, MCLGs could also be considered potential ARARs for surface water if the water bodies under consideration are not current or potential sources of drinking water.

SDWA, 40 CFR Part 141 - National Drinking Water Regulations, Maximum Contaminant Levels

The SDWA MCLs are legally enforceable federal drinking water standards. MCLs are commonly identified as ARARs for existing or potential future drinking water sources. However, MCLs would only be applicable where water at a CERCLA site is delivered through a public water supply system; they would be relevant and appropriate ARARs for existing or potential drinking water sources where it is not part of a public water system. MCLs could also be potential ARARs for surface waters if the surface water bodies on or potentially affected by the site not current or potential sources of drinking water.

SDWA, 40 CFR Part 143 - National Secondary Drinking Water Standards (SMCLs)

This regulation establishes SMCLs, which are non-enforceable limits intended as guidelines for use by States in regulating water supplies. These values are listed in Table A-1 under the Federal MCL column. Secondary drinking water criteria are identified with a "(2)" following the number.

SDWA, 40 CFR Parts 144, 146, 147, 1000 - Underground Injection Control Regulations

These regulations outline minimum program and performance standards for underground injection programs. Technical criteria and standards for siting, operation and maintenance, and reporting and recordkeeping as required for permitting are set forth in Part 146. This rule also provides for protection of underground sources of drinking water. Discharge of treated groundwater, by well injection, must be in accordance with all criteria and standards in these federal regulations, as well as meet all state Underground Injection Control Program requirements. Treated groundwater must meet all SDWA standards prior to well injection.

Solid Waste Disposal Act, Criteria for Classification of Solid Waste Disposal Facilities and Practices; (42 U.S.C. 6901-6987, 40 CFR Part 257)

This rule establishes criteria for use in determining which solid waste disposal facilities and practices pose a reasonable probability of adverse effects on human health or the environment and thereby constitute prohibited open dumps. If a remedial alternative involves on-site disposal, all limitations of this regulation must be met.

FEDERAL GUIDELINES TO BE CONSIDERED

USEPA Health Assessment Documents, Acceptable Intake, Chronic (AIC) and Subchronic (AIS)

The Acceptable Intake - Chronic and Acceptable Intake - Subchronic health assessment documents provide values developed for the Reference Doses (RfDs) and Health Effects Assessments (HEAs) for noncarcinogenic compounds. AIC and AIS values characterize the risks from these contaminants. This material provides guidance for assessing chronic and subchronic risks for noncarcinogenic compounds.

USEPA Human Health Assessment Cancer Slope Factors (CSFs)

Cancer Slope Factors are developed by the USEPA from HEA, or evaluation by the Human Health Assessment Group (HHAG). These values present the most up-to-date cancer risk potency information. HHAGs compute the individual cancer risk resulting from exposure to contaminants.

USEPA Office of Drinking Water, Health Advisories (HAs)

USEPA HAs are chemical concentrations based on estimates of risks due to consumption of contaminated drinking water. The HAs consider noncarcinogenic effects only, and should be considered for contaminants in groundwater used for drinking water.

Health advisories are estimates of risk due to consumption of contaminated drinking water. These advisories should be considered for contaminants in surface and groundwate which is or could potentially be used as a potable water source.

USEPA Reference Concentrations (RfCs)

RfCs are concentration levels developed by the USEPA for non-carcinogenic effects for lifetime exposure. RfCs values represent levels that, most likely, do not cause adverse effects to humans via inhalation of chemicals. RfCs are used to characterize

risks of soil and groundwater contaminant exposure (for the inhalation exposure scenario).

USEPA Reference Doses

USEPA RfDs are dose levels also developed for noncarcinogenic effects. RfDs are considered the levels unlikely to cause significant adverse health effects associated with a threshold mechanism of action in human exposure. RfDs are typically employed to characterize risks of soil and groundwater contaminant exposure for the dermal contact and ingestion pathways.

USEPA Office of Water Guidance, Water Related Fate of 129 Priority Pollutants (1979)

Presents chemical-specific fate and transport information for 129 priority pollutants. This document provides guidance to support the determination of contaminant fate and transport and is relevant to the site characterization, risk assessment, and fate and transport modelling components of the RI.

Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites; [OSWER Directive #9355.4-02]

Sets forth interim soil cleanup levels for lead in lieu of any USEPA verified toxicological values. Interim guidance recommends a cleanup level for total lead of 500 to 1,000 mg/kg. Site-specific conditions may warrant levels lower than 500 mg/kg, based on the exposure assessment.

APPENDIX A.2: SUMMARY OF WISCONSIN ARARS AND ADMINISTRATIVE CODE

Chapter NR 100: Environmental Protection

Chapter 100 outlines the discharge limits for both organic and inorganic mercury into State waters.

Chapter NR 102: Water Quality Standards for Wisconsin Waters

In conjunction with NR 103 to NR 105, this chapter establishes water quality standards for surface waters in the State of Wisconsin. This chapter describes the designated use categories for waters of the State and water quality criteria necessary to support these uses. The waters of the state are classified into fish and aquatic life categories described below:

- Great Lakes Communities; these waters include Lake Superior, Lake Michigan, and Green Bay and all associated bays, inlets, and spawning areas for anadromous fish species.
- Cold Water Communities; waters other than the Great Lakes communities which include surface waters capable of supporting cold water fish and other aquatic life or serving as a spawning area for such fish.
- Warm Water Sport Fish Communities; surface waters capable of supporting a community of warm water sport fish or serving as a spawning area for such fish.
- Warm Water Forage Fish Communities; surface waters capable of supporting abundant forage fish and other aquatic life.
- Limited Forage Fish Communities; surface waters of limited capacity and naturally poor water quality or habitat, capable of supporting only a limited community of forage fish and other aquatic life.

• Limited Aquatic Life; surface waters of severely limited capacity and naturally poor water quality or habitat which are capable of supporting only a limited community of aquatic life.

NR 102 states that all waters must meet the following conditions at all times and for all flow conditions:

- Substances which cause objectionable deposits on the shore or in the bed of a body of water must not be present;
- floating or submerged debris, oil, scum, or other material must not be present; and
- materials which produce color, odor, taste, or unsightliness may not be present in amounts which interfere with public rs in state waters.
- Substances which are toxic or harmful to humans may not be present in amounts which are a significant public health threat or which are acutely harmful to animal, plant or aquatic life.

Section NR 102.04(4) establishes the following criteria for all waters classified for fish and aquatic life:

- Dissolved oxygen content in the surface waters may not be lowered to less than 5 mg/L unless a variance in granted in accordance with Section NR 104.02(3).
- Temperature changes may not be so extreme that they adversely affect aquatic life. The maximum temperature rise at the edge of the mixing zone above the existing natural temperature may not exceed 5°F for streams and 3°F for lakes. The maximum allowable water temperature for warm water fish is 89°F.
- The range of pH must be within 6.0 to 9.0 with no change greater than 0.5 units outside seasonal minimum or maximum.
- Unauthorized concentrations of substances which are toxic to fish or aquatic life are not permitted.

• Streams classified as trout waters or as great lakes or cold water communities may not be altered so as to affect background temperature and dissolved oxygen levels.

Section 102.14 sets threshold concentrations for several substances causing taste and odor in water.

Chapter NR 103; Water Quality Standards for Wetlands

These regulations establish water quality standards for wetlands. The rule outlines the conditions necessary to protect water quality related functions and values of wetlands. To this end, the rule specifies that water quality values which must be protected include:

- storm and flood water storage and retention of water level fluctuation extremes;
- hydrologic function including the maintenance of dry season stream flow, discharge of groundwater to a wetland, recharge of groundwater from a wetland to another area, and the flow of groundwater through a wetland;
- filtration or storage of sediments, nutrients, or toxic substances that would have an adverse impact on other the quality of other state waters;
- shoreline protection against erosion through the dissipation of wave energy and water velocity and anchoring of sediments;
- habitat for aquatic organisms in the food web;
- habitat for resident and transient wildlife species; and
- recreational, cultural, educational, scientific, and natural aesthetic values and uses;

Wetland functional values and the impact of a proposed activity upon those values is determined using standardized wetland ecological methods such as:

- Wetland Evaluation Techniques (FHWA/COE);
- Wisconsin Wetland Evaluation Methodology;
- Hollands-Magee (IEP/Normandeau);
- Minnesota Wetland Evaluation Methodology for North Central United States; and the
- Wisconsin Department of Natural Resources Rapid Assessment Method.

<u>Chapter NR 104: Uses and Designated Standards (formerly Intrastate Waters - Uses and Designated Standards)</u>

Surface water classifications and effluent limitations are established in this rule. Classification by hydrologic characteristics includes the hydrologic description of lakes, diffused surface waters, wetlands, wastewater effluent channels, noncontinuous streams, and continuous streams. Effluent limitations for surface waters significant to the environmental integrity of the state or classified for fish and aquatic life, and wastewater treatment lagoons are also defined.

Chapter NR 106: Wisconsin Water Quality Standards: Procedures for Calculating Water-quality-based Effluent Limitations for Toxic and Organoleptic Substances Discharged to Surface Water

Wisconsin procedures for calculating effluent limitations are applicable to point sources that discharge wastewater containing toxic or organoleptic substances to surface waters. These regulations outline the calculations and data requirements necessary to calculate effluent limitations. If an alternative proposes to discharge treated groundwater at surface water body at BAAP, these requirements may apply.

W0039213.M80 6853-12

Chapter NR 108: Wisconsin Water Quality Standards; Requirements for Plans and Specifications Submittal for Renewable Projects and Operations of Community Water Systems, Sewerage Systems, and Industrial Wastewater Facilities

This rule establishes protocols for plan reviews and standards for treatment facilities in order to meet effluent standards.

Chapter NR 109; Wisconsin Water Quality Standards; Safe Drinking Water

This rule establishes water quality standards for potable water. These standards apply to all new and existing public water systems. Public water system, under the definition provided in this rules, means any system that has at least 15 service connections. Because BAAP waters are not used as a drinking water source, this rule will not be considered during the FS and remedial actions.

Chapter NR 115: Wisconsin's Shoreland Management Program

Chapter NR 115 requires counties to establish shoreland ordinances for all unincorporated shoreland areas. Shorelands are defined as the areas within 1,000 feet of a lake, pond, or flowage, or within 300 feet of rivers or streams or the floodplain. Each county must adopt regulations that meet or exceed minimum state standards to protect water resource values: natural beauty, water quality, recreation and navigation, and fish and wildlife. At a minimum, the ordinances must include (1) minimum lot sizes; (2) building setbacks from property lines and waterways; (3) controls on cutting trees and shrubbery; (4) standards for filling, grading, lagooning, dredging, ditching, and excavating; and (5) restrictions on improvements to older structures or uses that do not meet shoreland standards.

As specified in Chapter NR 115, Sauk County has adopted the Sauk County Shoreland Protection Ordinance (Sauk County Code of Ordinances, Chapter 8). This ordinance defines minimum lot sizes, building setbacks, restrictions to existing structure modification, controls on tree cutting, standards for fill, grading, lagooning, dredging, ditching, and excavating. This regulation may be applicable if any site-specific FS actions involved any of these activities at defined shorelands or wetlands. The shorelands/wetlands district includes all shorelands within the jurisdiction of this ordinance which are wetlands of 5 acres or more, (excluding point symbols) and which are shown on the Wisconsin Wetland Inventory Maps that are adopted and

made a part of this ordinance. A portion of a wetland which is less than 5 acres in size, and which is located in the unincorporated shoreland area within the county, shall be included in the shoreland/wetland district where the wetland as a whole is 5 acres or larger, but extends across the corporate limits of a municipality, across the county boundary or across the shoreland limits, so that the wetland is not regulated in its entirety by the county.

If an existing town shorelands ordinance is more restrictive than the County ordinance, the town ordinance prevails in respect to the greater restrictions but not otherwise.

Specifically, regarding setbacks, "Unless an existing development pattern exists, a setback of 75 feet from the ordinary high-water mark of an adjacent body of water to the nearest part of a building or structure shall be required for all building and structures, except piers, boat hoists, and boathouses."

Chapter NR 116: Wisconsin's Floodplain Management Program

This chapter regulates all construction activities in the floodplain. Any construction activity must be evaluated for impact on upstream flooding. Generally, no activities are allowed in the "floodway" including solid or hazardous waste disposal.

Chapter NR 117: Wisconsin's City and Village Shoreland-Wetland Protection Program

Chapter NR 117 requires cities and towns to establish shoreland-wetland zoning ordinances that create shoreland-wetland zoning districts for all wetlands of 5 acres or more, located in shorelands within the incorporated area of the city or village. The state, with input from cities and villages, developed inventory maps showing the location and type of all wetlands. Cities and villages have the option of zoning any wetland within their incorporated area, including wetlands that are smaller than 5 acres in size.

The State of Wisconsin defines a wetland as an area in which water is at, near, or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which has soils indicative of wet conditions. The

shoreland zone is defined as the area within 1,000 feet of a lake, pond, or flowage, or within 300 feet of a stream or the floodplain, whichever is greater.

Although local governments may enact more restrictive standards, the state permits the following uses in wetlands:

- recreation, such as hunting, fishing, trapping, and hiking
- forestry, including limited water level manipulation and some road construction
- harvesting of wild crops
- pasturing of livestock, including fence construction
- agricultural cultivation, including maintenance of existing drainage systems
- some limited construction of small buildings needed to support open space or wetland preservation uses
- pier, dock, and walkway construction
- development of parks, recreation areas, and fish and wildlife habitat improvement projects
- limited utility construction
- limited road construction for farming and forestry
- limited railroad construction

Some additional uses are allowed in cities and villages. Every shoreland-wetland zoning ordinance or zoning code must provide a system to issue land use or building permits.

Potential wetlands have been identified at five BAAP sites. Shoreland-wetland requirements will be addressed for those remedial alternatives evaluated during the FS process involving land use or construction within a wetland zoning district.

Chapter NR 140: Wisconsin Groundwater Quality Standards

Wisconsin groundwater quality standards apply to virtually all facilities, activities, and practices regulated by the state which may affect groundwater quality. Chapter NR 140 encompasses the following relevant areas:

- (1) it establishes two separate numerical standards for a wide group of pollutants. These are enforcement standards and preventative action limits (PALs) (Chapter NR 140.10 and Chapter NR 140.12).
- it specifies scientifically valid procedures for determining if a numerical standards has been attained or exceeded (Chapter NR 140.14);
- it specifies procedures for establishing points of standards compliance [Wisconsin Administrative Code (WAC), Chapter NR 140.22]; and,
- (4) it establishes sets of ranges of responses required if a groundwater standard (PAL or enforcement standard is attained or exceeded [Chapters NR 140.24, NR 140.26, and NR 140.27]).

Under Chapter NR 140, two separate standards, an enforcement standard and a PAL, were developed for public health (NR 140.10) and public welfare (NR 140.12). Enforcement standards are set at concentrations greater than PALs.

PALs are developed by using a percentage of enforcement standards (i.e., 10 percent for carcinogenic compounds and 20 percent for noncarcinogenic compounds), and must be achieved if technically and economically feasible. The feasibility of complying with a PAL is determined on a case-by-case basis.

According to NR 140.22, when designing a facility, enforcement standards and PALs can be applied at the following locations:

- any point of current groundwater use
- any point beyond the boundary of the property on which the facility, practice, or activity is located
- any point within the property boundaries beyond the three-dimensional design management zone if one is established by Wisconsin

W0039213.M80 6853-12

Department of Natural Resources (WDNR) at each facility, practice, or activity

For spills, discharges, and other remedial response actions, the point of standards application is every point at which groundwater is monitored to determine if a PAL or enforcement standard has been attained or exceeded.

Sections NR 140.24 and NR 140.26 delineate the range of remedial responses required after verification that PALs and enforcement standards are exceeded, respectively. In both sections, notification and evaluation criteria are presented. The difference in response requirements between NR 140.24 and NR 140.26 mainly are that WDNR, under NR 140.24, has the latitude to require no action, additional sampling, or further testing/study actions if a PAL is exceeded or attained. Under NR 140.24 the WDNR may also require the following responses:

- Revise the operational procedures at the facility, practice, or activity.
- Change the design or construction of the facility, practice, or activity.
- Develop an alternate method of waste treatment or disposal.
- Prohibit or close and abandon a facility, practice, or activity.
- Conduct a remedial action to renovate or restore groundwater quality.
- Revise rules or criteria on facility design, location, or management practices.

Under Chapter NR 140.26, if a determination is made that an enforcement standard is violated at a point of compliance WDNR requires one of the above actions with no exceptions (i.e., no provision for a no-action response).

Section NR 140.27 states that attainment or exceedance of an enforcement standard at a point other than a point of compliance requires a response the same as for NR 140.24.

Chapter NR 200: Wisconsin Water Pollution Control Regulations: Applications for Discharge Permits

Permits are required for discharges of pollutants from point sources to surface waters and to land areas where pollutants may percolate, seep to, or be leached to groundwaters. Definitions are provided for in the Water Pollution Control Regulations (Parts 200-239) and describes the requirements for discharge permits.

Chapter NR 205: Wisconsin Water Pollution Regulations: General Provisions

Wisconsin Pollutant Discharge Elimination System (WPDES) permit program is similar to the federal NPDES program under the CWA. Discharge of pollutants to waters of the state is prohibited without a valid WPDES permit. WDNR may impose monitoring, recordkeeping, and reporting requirements on the WPDES permit. Discharge standards are generally determined by the state on a case-by-case basis.

Chapter NR 215: Wisconsin Water Pollution Control Regulations: List of Toxic Pollutants

A list of toxic pollutants is provided in this chapter. According to the requirements of Chapter 147, Stats., all discharges containing these pollutants must not contain quantities of these pollutants which are greater than the amount which would remain after the discharge had received treatment by the best available technology economically achievable. Also, the quantities may also not exceed any lesser quantity necessary to provide an ample margin of safety, as determined by WDNR. Nearly all of the listed contaminants of concern for BAAP are included in this list of toxic pollutants.

Chapter NR 218: Wisconsin Water Pollution Control Regulations: Method and Manner of Sampling

This chapter provides the methods and manner for collection of effluent samples to comply with the monitoring requirements established in chapter 147, Stats., and WPDES permits. Methods for measuring flow rate, calibration of flow measuring devices, location of sampling points, and size and storage of samples is addressed.

W0039213.M80 6853-12

Chapter NR 219: Wisconsin Water Pollution Control Regulations: Analytical Test Methods and Sampling Procedure

Analytical test methods, preservation procedures, requirements for laboratories, and procedures applicable to effluent limitations for discharges point sources are established in this chapter.

Chapter NR 220: Wisconsin Water Pollution Control Regulations: Categories and Classes of Point Sources and Effluent Limitations

Categories and classes of point sources and effluent limitations are established in this rule. This chapter also lists industries for which standards have been established. Explosives manufacturing is included in this list.

Chapter NR 400: Wisconsin General and Portable Sources Air Pollution Control Rules: Air Pollution Control Definitions

Definitions for Chapters NR 400 to 499 are included in this chapter.

Chapter NR 404: Wisconsin General and Portable Sources Air Pollution Control Rules: Ambient Air Quality Standards

Under WAC, Chapter NR 404, Wisconsin established primary and secondary ambient air quality standards for sulfur oxides, suspended particulates, carbon monoxide, ozone, nitrogen dioxide, lead, and particulate matter with an aerodynamic diameter less than or equal to a nominal PM_{10} . The primary air standard is the level of air quality that provides protection for public health with an adequate margin of safety. The secondary air standard is the level of air quality that may be necessary to protect public welfare from unknown or anticipated adverse effects.

The secondary standard for total suspended particulates is $150 \,\mu\text{g/m}^3$, maximum 24-hour average concentration, not to be exceeded more than once a year. The primary and secondary standards for lead and its compounds, measured as elemental lead, are $1.5 \,\mu\text{g/m}^3$, maximum arithmetic mean average over a calendar quarter, as a constituent of suspended particulate matter. The primary and secondary standards

for PM₁₀ are (1) 50 μ g/m³, annual arithmetic mean concentration, and (2) 150 μ g/m³, maximum 24-hour average concentration. Sulfur dioxide and nitrogen dioxide releases to the atmosphere may be of concern if soils contaminated with nitrates or sulfates are incinerated. The primary standards for sulfur oxides, measured as sulfur dioxide, are 80μ g/m³, annual arithmetic mean, and 365μ g/m³ maximum 24-hour average not to be exceeded more than once per year. The secondary standard is 1,300 μ g/m³, maximum 3-hour average concentration, not to be exceeded more than once per year. The primary and secondary standards for nitrogen dioxide are 100μ g/m³, annual arithmetic mean. The standards may be applicable during excavation, incineration of soils, and construction-related activities at BAAP.

Chapter NR 406 and NR 409: Wisconsin General and Portable Sources Air Pollution Control Rules: Construction or Modification and New Operation Permits

Chapter NR 406 requires permits for construction or modification of stationary sources of air pollution and operation of new stationary sources. Section NR 406.04 identifies specific and general categories of sources exempt from the permit requirements. Specific categories of exempt sources include but are not limited to (1) certain fuel-burning equipment that does not burn hazardous waste; (2) equipment designed to burn solid wastes, which are not pathological wastes or hazardous wastes, at a rate of not more than 500 pounds per hour; (3) storage tanks containing petroleum liquid or organic compounds that are not volatile organic compounds (VOCs), with a maximum capacity of not more than 40,000 gallons; and (4) VOC storage tanks with a maximum capacity of not more than 10,000 pounds.

The regulations also include a general category of exempt sources, and identify certain pollutants and standards that may not be exceeded without considering pollution control equipment in order for the source to be exempt from the permit requirements. The exemptions apply when the following conditions exist:

- The source will not emit sulfur dioxide, carbon monoxide, or nitrogen oxides at a rate of more than 9 pounds per hour for each pollutant emitted, without considering pollution control equipment.
- The source will not emit particulate matter or organic compounds at a rate of more than 5.7 pounds per hour for each pollutant emitted, without considering pollution control equipment.

- The source will not emit PM₁₀ at a rate of more than 3.4 pounds per hour, without considering pollution control equipment.
- The source will not emit any of the following air contaminants at a rate greater than the applicable emission rate listed:
 - fluorides, 3 tons per year
 - hydrogen sulfide, 10 tons per year
 - reduced sulfur compounds, 10 tons per year
 - total reduced sulfur, 10 tons per year
 - vinyl chloride, 1 ton per year
- The source's potential emissions at full capacity, without considering pollution control equipment, of any hazardous air contaminant listed in Chapter NR 445.04 are not greater than the emission rate listed.
- The source will not emit any air contaminant at a rate of more than 6 pounds per hour for each pollutant emitted, without considering pollution control equipment.

Under WAC, Chapter NR 409, a new permit must be obtained when a portable source is relocated to a new site. Portable sources are subject to the same exemptions for new stationary sources listed under Chapter NR 406.

Chapter NR 415: Wisconsin Particulate and Sulfur Emissions Rules; Control of Particulate Emissions

Chapter NR 415 applies to all air contaminant sources and requires precautions to be taken to prevent particulate matter from becoming airborne. Examples of precautions include but are not limited to use of water or chemicals for control of dust, application of plastic covering on material stockpiles and surfaces which can create airborne dust, or covering or securing of materials likely to become airborne while being moved on public roads. WAC, Chapter NR 415.05 specifies particulate emission limits for certain processes. In addition, particulate emissions limits were developed for fuel-burning equipment and incinerators (Chapters NR 415.06 and NR 415.07, respectively), depending on unit specifications. In particular, the limit for incinerators on which construction commenced after April 1, 1972, and which are rated at 4,000 pounds of waste per hour or more, is 0.15 pounds of particulate per

1,000 pounds of exhaust gas. The limit for incinerators rated at over 500 pounds and less than 4,000 pounds of waste per hour is 0.21 pounds of particulate per 1,000 pounds of exhaust gas. For incinerators rated at 500 pounds of waste per hour or less, other than prefabricated domestic incinerators below a 5-cubic-foot capacity, the limit is 0.30 pounds of particulate matter per 1,000 pounds of exhaust gas. Prefabricated domestic incinerators below a 5-cubic-foot capacity must not exceed the performance emission requirements prescribed by the United States of America Standards Institute for domestic incinerators (Standard Z21.6).

Chapter NR 419: Wisconsin Organic Compound Emissions Rules

Chapter NR 419 requires that reasonable precautions be taken when handling organic compounds to prevent spillage or escape or emission of organic compounds, solvents, or mixtures. In addition, no person may dispose of more than 5.7 liters of any liquid VOC waste, or any liquid, semisolid, or solid waste materials containing more than 5.7 liters (1.5 gallons) of any VOC, in any one day from a facility in a manner that would permit evaporation into the ambient air during the ozone season. This includes but is not limited to the disposal of VOCs that must be removed from VOC control devices so as to maintain the devices at the required operating efficiency.

The quantity of VOCs that evaporates into the ambient air during the ozone season must not exceed 15 percent (by weight) or 5.7 liters in any one day, whichever is larger. If remedial actions could result in the release of VOCs to the atmosphere, such as could occur during air stripping, this regulation will be considered.

<u>Chapter NR 422: Control of Organic Compound Emissions from Surface Coating.</u> <u>Printing.</u> and Asphalt Surfacing

This chapter establishes requirements for the control of emissions resulting from surface coating and printing processes and for the use of cutback asphalts for surfaces intended for use by motor vehicles, bicycles, and pedestrians. May be applicable if hot mix asphalt is selected as a remedial alternative.

W0039213.M80 6853-12

Chapter NR 426; Wisconsin Carbon, Lead, and Nitrogen Emission Rules; Control of Carbon Monoxide Emissions

Chapter NR 426 states that carbon monoxide may not be emitted into the ambient air in concentrations which contribute substantially to exceeding of an air standard or which cause air pollution. New direct sources may not release significant emissions of carbon monoxide unless these emissions are subjected to incineration at 1,300°F for 0.3 seconds. The concentration of carbon monoxide can also be reduced by some other means to an equivalent amount.

Chapter NR 427; Wisconsin Carbon, Lead, and Nitrogen Emission Rules; Control of Lead Emissions

This chapter states that lead or lead compounds cannot be emitted to the ambient air in quantities that exceed an air standard or air increment, or which creates air pollution.

Chapter NR 428: Wisconsin Carbon, Lead, and Nitrogen Emission Rules: Control of Nitrogen Emissions

Chapter NR 428 states that nitrogen oxides or nitrogen compounds may not be emitted to the ambient air which substantially contributes to exceeding of a air standard or cause air pollution.

Chapter NR 429: Wisconsin Malodorous and Visible Emissions Rules: Control of Malodorous Emissions and of Open Burning

This chapter establishes emission limitation, odor tests, and abatement or control requirements for malodorous air contaminant sources and to limit the conditions under which open burning is permitted in order to protect air quality. Section 429.04 addresses exceptions for open burning of explosive or dangerous materials for which there is no other safe means of disposal.

Chapter NR 445: Wisconsin Hazardous Air Pollutants Emissions Standards

Chapter NR 445 applies to all air contaminant sources and to all owners or operators of an air contaminant source, unless it is a specifically regulated source under Chapters NR 446 through NR 449 or the NESHAPS. (NOTE: Chapters NR 446 through NR 449 and NESHAPS are not generally applicable to hazardous waste remedial activities because the activities do not usually use one of the specific source categories regulated. Chapters NR 446 through NR 449 and NESHAPS are intended for a specific type of source and not all sources of that pollutant.)

A hazardous air contaminant is defined as any air contaminant for which no ambient air quality standard is set in Chapter NR 404 of the WAC and which the department determines may cause or significantly contribute to mortality, or in a serious irreversible or incapacitating reversible illness, or may pose a significant threat to public health or the environment. Hazardous air contaminant emission concentrations are percentages of threshold limit values established by the American Conference of Governmental Industrial Hygienists. These percentages are specified in Chapter NR 445. Specific application of these standards will be determined on a site-specific basis during the FS process. Emission standards are listed for each contaminant for 24- and 1-hour averaging periods. The standards may be applicable to remedial activities that involve treatment by a process which generates hazardous air contaminant emissions. Some emission rates which may be considered at BAAP are listed in the following table.

Hazardous Air Contaminants with Acceptable Ambient Concentrations			
contaminants	emission rate in lbs/hr w/emission points <25 ft	emission rate in lbs/hr w/emission points ≥25 ft	
P-Nitroaniline	0.249600	1.032000	
Nitrobenzene	0.417600	1.752000	
Diethyl phthalate	0.417600	1.75200	
Trichloroethylene	22.485600	94.416000	
Hazardous Air Contaminants with Acceptable Ambient Concentrations (compliance to be achieved by April 1, 1993)			
Dinitrotoluene	0.124800	0.504000	
Aluminum - pyro powders	0.417600	1.752000	
- soluble salts	0.165600	0.672000	
Chromium (metal, compounds)	0.040800	0.170400	
Cobalt (metal, dust)	0.004080	0.017040	

Hazardous Air Contaminants Without Acceptable Ambient Concentrations Requiring Application of Best Available Control Technology		
contaminant	lbs/years ²	
Acrylonitrile	25.0	
Carbon Tetrachloride	25.0	
N-Nitrosodi-n-propylamine (total nitrosoamines)	250.0	
Nickel Compounds	250.0	

Chapters NR 500-520: Wisconsin Solid Waste Management Regulations

These regulations outline requirements for solid waste landfill construction, operation, and closure. The requirements include performance and location standards, and design, operation, and closure criteria.

A solid waste landfill may not be located within 1,000 feet of any navigable lake, pond, or flowage; 300 feet of any navigable river or stream; a floodplain; 1,000 feet of the nearest edge of any state trunk highway, interstate, or federal aid primary highway, or the boundary of any public park unless the landfill is not visible; or 1,200 feet of any public or private water supply well. The location of a solid waste landfill also must not cause significant adverse impacts to wetlands critical habitat areas, surface water, or groundwater.

Remedial actions that involve closure of a landfill that contains nonhazardous solid waste must comply with the design requirements outlined in WAC, Chapter NR 504.07. In general, all final cover systems must be designed to minimize leachate generation, reduce facility maintenance by stabilizing the final surface through design of compatible slopes and vegetation, minimize climatic effects, and provide removal of leachate and venting of gas.

When closing a facility, the owner or operator must notify the WDNR in writing at least 120 days prior to closing and restrict access within 10 days of ceasing to accept waste. Closure should be accomplished in the following manner unless a different closure plan or plan of operation has been approved:

- 1. The entire area previously used for disposal purposes must be covered with at least 2 feet of compacted earth sloped adequately to allow surface water runoff.
- 2. Surface water run-on must be diverted around all areas used for waste disposal to limit the potential for erosion and increased infiltration. Drainage swales conveying surface water runoff over previous waste disposal areas must be lined with a minimum thickness of 2 feet of clay.
- 3. The final slopes of the facility must be greater than 2 percent, but must not exceed 3 horizontal to 1 vertical.

- 4. The finished surface of the disposal area must be covered with a minimum of 6 inches of topsoil.
- 5. The area must be vegetated within 90 days after ceasing to accept wastes or, if waste termination is after September 15, within 90 days after March 15 of the following year.

The WDNR may require the facility to have a gas venting system if necessary. Under Section NR 508.04, WDNR may require monitoring at existing facilities, regardless of whether the facility remains in operation. Specifications for monitoring are outlined. Sampling frequency for groundwater is based on the size of the facility. Leachate head wells must be measured at least monthly for leachate level elevations. Sampling parameters must be specified in writing by the WDNR.

Chapter NR 600: Hazardous Waste Management Rules; General

This chapter provides definitions for Wisconsin's Hazardous Waste Management Rules (Chapters NR 600-699) and general permit application information. Section NR 600.04 also specifies four prohibited activities:

- underground treatment of any hazardous waste through a well;
- land treatment of any hazardous waste;
- the use of solid waste, used oil, or other material which is contaminated or mixed with a hazardous waste for dust suppression or road treatment; or
- the placement of any noncontainerized or bulk hazardous waste in a salt dome formation salt bed formation, underground mine, or cave.

This chapter also incorporates reference citations and general information concerning the hazardous waste management program.

Chapter NR 605; Wisconsin Hazardous Waste Management Rules; Identification and Listing of Hazardous Waste Rules

These rules establish criteria for identifying the characteristics of hazardous waste and establishes a list of hazardous wastes based on these criteria. These rules are used to determine if waste handled by a solid waste generator, transporter, or owner/operator of a solid waste facilities is a hazardous waste subject to regulation.

Chapter NR 610: Wisconsin Hazardous Waste Management Rules; Small Quantity Generator Standards

This chapter specifies requirements that apply to small and very small quantity generators of hazardous waste. This rule defines very small generators as producing less than 100 kilograms of hazardous waste in a calendar month; and does not accumulate at any time quantities of hazardous waste greater than 1000 kilograms. Very small generators are exempt from full regulation if the requirements listed in NR 610.07 are met. BAAP is most likely a very small generator of hazardous waste. That waste is the result of burning of propellants in a steel burning dish, which generates a very small quantity of ash.

<u>Chapter NR 620: Wisconsin Hazardous Waste Management Rules; Hazardous Waste Transporter Standards</u>

The requirements which apply to the transportation of hazardous waste, as well as the licensing requirements for transporters of hazardous waste, are established in this chapter. Requirements for the implementation of a manifest system are described in NR 620.07 The rules also outlines the packaging, labeling, marking and placarding requirements in NR 620.11 which must be met for a transporter to move a transport vehicle containing hazardous waste. The rule states that packing must be conducted in accordance with 49 CFR Part 173, November 1, 1985 and labeled, marked, and placarded in accordance with 49 CFR Part 172, November 1, 1985

Chapter NR 625; Wisconsin Hazardous Waste Management Rules; Hazardous Waste Recycling Standards

This regulation provides exemptions from the requirements of NR 600.04 and Chapters NR 630 through 680 for legitimate recovery or reclamation of hazardous waste.

Chapter NR 630; Wisconsin Hazardous Waste Management Rules; Storage, Treatment and Disposal Facility General Standards

This chapter specifies the general requirements that apply to the storage, treatment, and disposal of hazardous waste. Chapter NR 630.12 describes the requirement for general waste analysis for hazardous waste. This rule requires that an owner or operator of a hazardous waste facility conduct a detailed chemical and physical analysis of a representative sample of waste before treatment or disposal of any hazardous waste. Chapter NR 630.13 describes the waste analysis plan which must be prepared and followed by the owners and operators of a hazardous waste facility. This rule further specifies locations where a hazardous waste facility may not be located, including:

- Floodplains
- Wetlands
- Endangered species habitats
- Within 200 feet from facility property line without locking (subject to WDNR ruling)
- Within 200 feet of a fault which has had displacement during the Holocene time.

The rule also establishes standards for open burning and detonation of explosives in NR 630.20. Table VII, in Section 623.20, establishes the minimum distance, from open burning or detonation of waste explosives or propellants, to the property owned by other persons.

Section NR 630.21 establishes preparedness and prevention measures required in the design, construction, maintenance, and operation of a hazardous waste facility. Requirements for a contingency plan are detailed in Section NR 630.22.

Chapter NR 635: Wisconsin Groundwater Standards for Hazardous Waste: Groundwater and Leachate Monitoring Standards and Corrective Action Requirements.

This rule specifies groundwater and leachate monitoring requirements, as well as corrective action requirements resulting from a monitoring program. Existing landfills or impoundments are defined as facilities having accepted hazardous waste after November 19, 1980 but not after July 26, 1982. The monitoring requirement for existing landfills is contained in Section 635.17. The requirements of Section NR 635.05 and 635.16 apply to all landfills, surface impoundments, and waste piles that accepted wastes after July 26, 1982.

Solid waste disposal facilities which are approved under NR 506.15 to accept hazardous waste only from very small quantity generators are exempted from this rule.

Chapter NR 640: Wisconsin Hazardous Waste Container Standards

This rule provides environmentally acceptable hazardous waste treatment and storage operations for hazardous waste facilities that store or treat hazardous waste in containers. Small quantity generators accumulating waste on-site in containers which are in compliance with Chapter NR 610 and large quantity generators who are in compliance with Chapter NR 615. This rule may apply if hazardous wastes are held in containers on site prior to or during on-site treatment. A totally enclosed treatment facility, however, would be exempted from this rule.

Chapter NR 645: Wisconsin Hazardous Waste Tauk System Standards

This rule provides environmentally acceptable hazardous waste treatment and storage operations for hazardous waste facilities that store or treat hazardous waste in tank systems. Small quantity generators accumulating waste on-site in tanks which are in compliance with Chapter NR 610 and large quantity generators who are in compliance with Chapter NR 615. This rule may apply if hazardous wastes are held in containers on site prior to or during on-site treatment. A totally enclosed treatment facility, however, would be exempted from this rule.

Chapter NR 655; Wisconsin Hazardous Waste Pile Standards

This chapter specifies the requirements which apply to hazardous waste piles. The rule states that an interim license, operating license, variance, or waiver from the department must be obtained to store or treat hazardous waste in a waste pile. Section 655.05 establishes that the design, construction and operational requirements specified in sections NR 655.07, 655.10, 660.11, 660.12, and 660.13 and the monitoring requirements in NR 635 be met. This rule may be considered during the FS process if hazardous materials are stored in a waste pile prior to or during treatment.

Chapter NR 635: Wisconsin Groundwater Standards for Hazardous Waste: Groundwater and Leachate Monitoring Standards and Corrective Action Requirements.

This rule specifies groundwater and leachate monitoring requirements, as well as corrective action requirements resulting from a monitoring program. Existing landfills or impoundments are defined as facilities having accepted hazardous waste after November 19, 1980 but not after July 26, 1982. The monitoring requirement for existing landfills is contained in Section 635.17. The requirements of Section NR 635.05 and 635.16 apply to all landfills, surface impoundments, and waste piles that accepted wastes after July 26, 1982.

Solid waste disposal facilities which are approved under NR 506.15 to accept hazardous waste only from very small quantity generators are exempted from this rule.

Chapter NR 660; Wisconsin Hazardous Waste Landfill Standards: Landfill and Surface Impoundment Standards.

This chapter applies to owners and operators of facilities that treat, store, or dispose of hazardous waste in landfills or surface impoundments. Specific location restrictions are given in Section NR 660.06. The chapter also discusses the requirements for initial site inspection and report, feasibility report, plan of operation, and minimum design requirements in Sections NR 660.07, 08, 09, 10, and 13, respectively.

Exemptions to this rule include surface impoundments which have discharges regulated under Chapter 147, a solid waste disposal licensed under Chapters 500 to 522, and facilities operating under interim licenses.

Chapter NR 665: Wisconsin Hazardous Waste Incinerator Standards

Requirements and standards that apply to incinerators that burn hazardous waste are addressed in this chapter. This rule requires that an interim license, operating license, variance, or waiver be obtained to incinerate hazardous wastes in accordance with NR 600.9 and NR 680.

Prior to constructing a hazardous waste incinerator an initial operating license under NR 680 must be obtained. This requires an approved feasibility study and plan or operation report. The requirements for these reports in provided in NR 665.06. Operation requirements for incinerators include:

- operation of the incinerator should minimize interference with other activities.
- A sign must be posted to show the name, license number, and hour of operation.
- All hazardous waste must be confined to a designated storage area.
- Hazardous waste may only be stored in tanks or containers in accordance with NR 640 and NR 645.
- The incinerator must be brought to steady state, normal conditions, including steady state temperature and air flow, using auxiliary fuel or other means, before adding hazardous waste.
- Records must be maintained for a minimum of 3 years, including records of weights of materials incinerated, the quantity of resulting residue, and hours of plant operation.
- Records must detail all training required and completed.
- Adequate cleaning equipment must be available.

- Charging openings and other equipment must be provided with adequate safety equipment.
- WDNR must be allowed to inspect new incinerators after completion and at least 10 days prior to operation.
- Monitoring and inspections must be conducted in accordance with section NR 665.09(11)(a-g).
- An automatic cut off device must be operational which will cut off waste feed when a deviation from or exceedance of the limits.
- Required removal efficiencies for a variety of wastes is provided in section NR 665.09(13).
- Operations must conform to the requirements specified in the license.
- The department will specify acceptable operating limits based on the results of the analysis and trial burns.
- Hazardous waste may not be fed into the incinerator during start-up or shut-down unless the incinerator is operating within the conditions of operation.
- Fugitive emissions must be controlled by either: (1) keeping the combustion zone sealed; (2) maintaining a combustion zone pressure of lower the atmosphere; or (3) an alternate means equivalent to (2).
- The incinerator must cease operations if waste feed, incinerator design, or operating conditions exceed limits designated in license.
- The incinerator must be designed to meet the requirements in NR 640.06.

The rule further states that throughout the operating period, unless the owner or operator can demonstrate that the residue removed from the incinerator is not a hazardous waste, the owner or operator becomes a generator of hazardous waste.

Chapter NR 670: Miscellaneous Hazardous Waste Standards: Miscellaneous Unit Standards

This chapter specifies requirements that apply to facilities that are not specified otherwise. Prior to establishing or constructing a miscellaneous unit, an operating license must first be issued following approval of a feasibility study and plan or operation report.

Standards for miscellaneous units are based on protection of human health and the environment that may be due to migration of waste constituents: in the groundwater or subsurface environment; in surface water, wetlands, or on the soil surface; and in the air. Parameters which must be considered are described in section NR 670.08.

Requirements for thermal treatment facilities other than incinerators is addressed in section NR 670.11.

Chapter NR 675: Wisconsin Hazardous Waste Land Disposal Restrictions

This chapter identifies hazardous wastes that are restricted from land disposal and defines those limited circumstances under which an otherwise prohibited waste may continue to be disposed of on land. An exemption from this rule may be obtained if certain conditions are met. This exemption would allow wastes which are otherwise prohibited from land disposal to be treated in a surface impoundment. Evaporation of hazardous constituents as the principal means of treatment is not included in this exemption. Treatment standards are expressed as concentrations of waste extract for contaminants of concern.

Chapter NR 680: Hazardous Waste Facility Licensing Regulations

Minimum standards for reports, plan submittals, and the issuance of licenses and variances for facilities which recycle, treat, store, or dispose of hazardous waste are established in this chapter. The fee schedule for facilities other than landfills and surface impoundments is provided in Table XII of the rule. The fee schedule for landfill and surface impoundments is provided in Table XIII.

Chapter NR 685: Hazardous Waste Facility Closure Regulations

This chapter establishes requirements for closure, long-term care, and financial responsibility of hazardous waste facilities.

Closure performance standards require that a hazardous waste facility must be closed in a manner that: minimizes further maintenance; manages post closure escape of wastes, hazardous leachate, contaminated runoff or waste decomposition products to ground or surface waters or the atmosphere; and meets other closure requirements established with the Wisconsin Hazardous Waste Management Rules.

The rule further establishes that the owner must provide long-term care for the closed hazardous waste facility for 30 years after closure.

Wisconsin Statutes Annotated, Chapter 30, Dredge and Fill Requirements

This statute outlines permit requirements for structures and deposits in Wisconsin navigable waters and for enlargement of waterways. These requirements will be considered and complied with when developing and implementing remedial actions at BAAP that involve navigable waters. Under Section 30.12, it is unlawful to deposit any material or to place any structure on the bed of any navigable water without a permit where no bulkhead line has been established or beyond a lawfully established bulkhead line. A structure must not materially obstruct navigation or reduce the effective flood flow capacity of a stream, and must not be detrimental to the public interest.

Under Section 30.19, unless a permit has been granted, it is unlawful to construct, dredge, or enlarge any artificial or natural waterway, canal, channel, ditch, lagoon, pond, lake, or similar waterway where the purpose is ultimate connection with an existing navigable stream, lake, or other navigable waters, or where any part of the artificial waterway is located within 500 feet of the ordinary high-water mark of an existing navigable stream, lake, or other navigable waters. A permit is also required for grading or removing topsoil from the bank of any navigable stream, lake, or other body of navigable water where the area is exposed by the grading and where removal will exceed 10,000 square feet. Exceptions are granted for public highways, agricultural uses, lakes and streams located in certain counties with a population of 750,000 or more, and any work required to maintain the dimensions of an enlarged waterway.

Chapter 30 also addresses bridge construction and maintenance, waterfowl habitat management, cutting weeds in navigable waters, wharves, piers, swimming rafts, diversions of water from lakes and streams, and removal of material from beds of navigable waters.

If the response action is conducted entirely on-site, a permit would not be required.

City of Baraboo Floodplain Zoning Code (Subchapter II)

The Baraboo Floodplain Zoning Code divides floodplain areas into three districts: the Floodway District, the Flood Fringe District, and the General Floodplain District. The Floodway District is the channel of a stream and those portions of the floodplain adjoining the channel that are required to carry and discharge the floodwater or flood flows of any river or stream associated with the regional flood. The Flood Fringe District is the area between the regional flood limits and the floodway area. The General Floodplain District is the land that has been or may be hereafter covered by floodwater during the regional flood and encompasses both the Floodway and Flood Fringe districts.

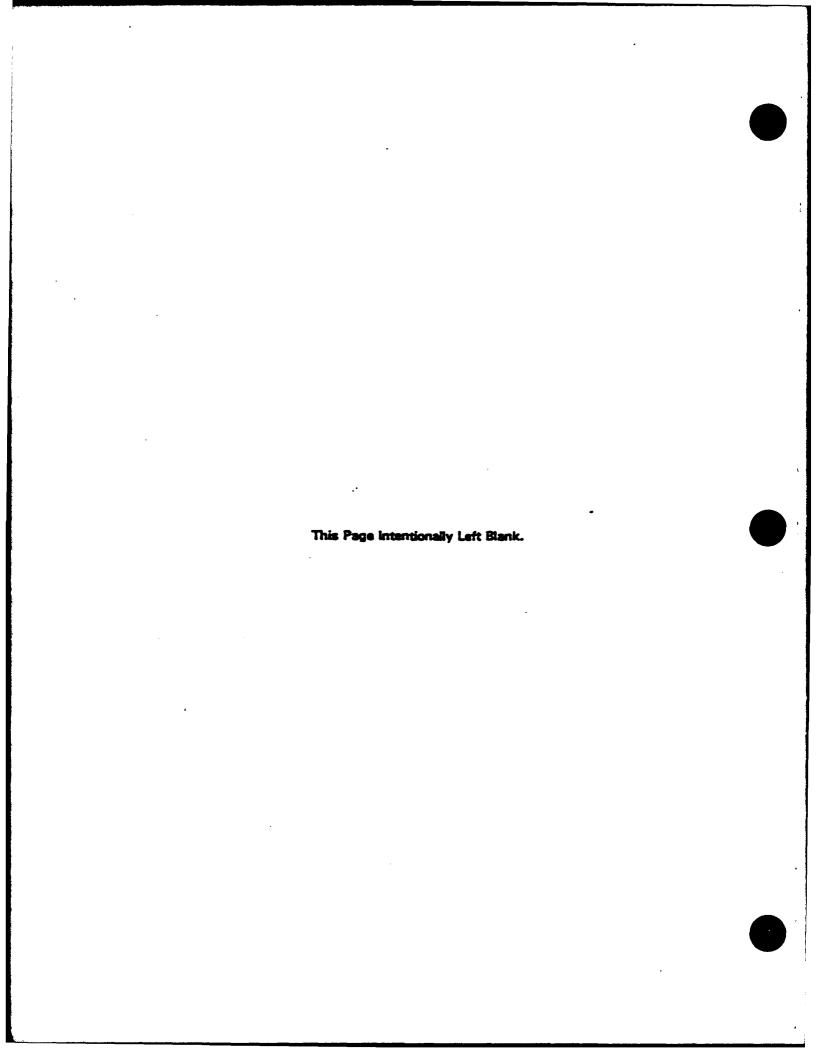
Certain activities are prohibited or subject to specific restrictions in floodplain areas. Within the Floodway District, only open space having low flood damage potential and not obstructing flood flows is permitted, including agricultural uses, nonstructural industrial or commercial uses (e.g., parking lots), public and private recreational uses, extraction of sand or gravel, marina- and boat-related structures, railroads, pipes, streets, and culverts. Specific standards for developments in floodway areas are listed.

In the Flood Fringe District, any structures, land use, or development may be permitted, provided a land use permit has been issued by the Building Inspector. Manufacturing and industrial buildings, structures, and accessory uses must be elevated or flood-proofed to 2 feet above the regional flood elevation. The storage or processing of materials that are buoyant, flammable, or explosive, or which in times of flooding could be injurious to human, animal, or plant life, must be at or above the flood protection elevation or flood-proofed. All solid waste disposal sites, whether public or private, are prohibited in flood fringe areas.

A building permit must be obtained for construction in a floodplain. Flood-proofing measures must be designed consistent with the flood protection elevation for the particular area associated with it. The applicant must submit a plan or document

certified by a registered professional engineer or architect that the flood-proofing measures are adequately designed for protection to the flood protection elevation for the particular area. All flood-proofing must provide anchorage to resist flotation and lateral movement.

All zoning and permit requirements associated with activities within a floodplain will be considered if remedial or construction activities at BAAP involve work in a floodplain.



ACLs Alternate Concentration Limits
AIC Acceptable Intake - Chronic
AIS Acceptable Intake - Subchronic

ARARs Applicable or Relevant and Appropriate Requirements

AWQC Ambient Water Quality Criteria

BAAP Badger Army Ammunition Plant
BACT Best Available Control Technology

BOD biochemical oxygen demand

CAA Clean Air Act

CAAAs Clean Air Act Amendments

CERCLA Comprehensive Environmental Response, Compensation, and

Liability Act

CSD Treatment standards for hazardous soil and debris

CSFs Cancer Slope Factors
CWA Clean Water Act

DOT Department of Transportation

EO Executive Order

ESA Endangered Species Act

FS Feasibility Study

FWQS Surface Water Quality Standard

HA Health Advisories

HAPs Hazardous Air Pollutants HEAs Health Effects Assessment

HHAG Human Health Assessment Group

HSWA Hazardous and Solid Waste Amendment

LDRs Land Disposal Regulations

MACT Maximum Achievable Control Technology

MCL Maximum Contaminant Level

MCLGs Maximum Contaminant Level Goals

mg/L milligrams per liter

NAAQS National Ambient Air Quality Standards

NEPA National Environmental Policy Act

NESHAP National Emission Standards for Hazardous Air Pollutants

NCP National Contingency Plan

NPDES National Pollutant Discharge Elimination System

NSPS New Source Performance Standards

OSHA Occupational Health and Safety Act

PAL preventative action limits

POTW publicly owned treatment works

PSD Prevention of Significant Deterioration

RfC Reference Concentration

RfD Reference Dose

RCRA Resource Conservation and Recovery Act

SDWA Safe Drinking Water Act
SIPs State Implementation Plans

SMCLs National Secondary Drinking Water Standards SPCC Spill Prevention, Control, and Countermeasure

TCLP Toxicity Characteristic Leaching Procedure

TDS total dissolved solids

tpy tons/year

TSDF transfer storage and disposal facility
TSP total suspended particulate matter

TSS total suspended solids

 μ g/m³ micrograms per cubic meter USACE U.S. Army Corps of Engineers

USEPA U.S. Environmental Protection Agency

USFWS U.S. Fish and Wildlife Service UST Underground Storage Tanks

VOCs volatile organic compounds

WAC Wisconsin Administrative Code

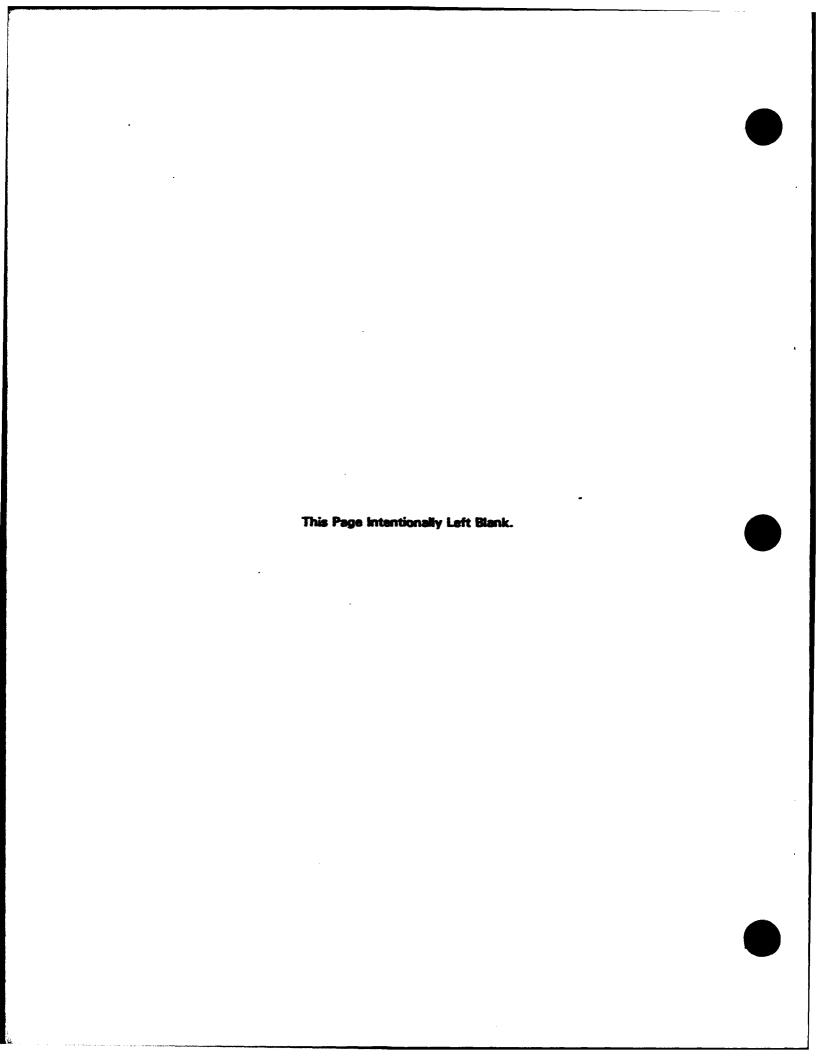
WDNR WPDES

Wisconsin Department Natural Resources Wisconsin Pollutant Discharge Elimination System

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APPENDIX B SOIL VAPOR SURVEY

W0039213B.APP 6853-12



APPENDIX B: SOIL VAPOR SURVEY

B.1 STANDARD OPERATING PROCEDURES

This section contains the standard operating procedures followed by Northeast Research Institute Inc. (NERI) of Farmington, Connecticut, while performing the Petrex soil vapor survey at BAAP during the RI.

B.1.1 Sample Production and Preparation

<u>Charcoal Sieving</u>. The static volatile organic compound (VOC) collector is prepared by applying presieved activated charcoal to the end of a ferromagnetic wire.

<u>Charcoal Bonding</u>. The procedure for preparing the activated charcoal is proprietary information. The procedure results in the production of a collector consisting of size-sorted activated charcoal bonded to the area within 1 cm of the end of a ferromagnetic wire with a Curie point of 358°C.

Collector Containers. Culture tubes, measuring 25 mm by 125 mm and having a screw cap closure, are washed in a biodegradable detergent, rinsed in methanol, and baked at 180°C for 1 hour.

<u>Wire Cleaning</u>. The previously constructed wires are cleaned by heating in a special apparatus at 358°C a total of 35 times. The wires are cleaned in lots of 32 wires. From each lot, two wires are removed for immediate analysis to verify the cleanliness of the lot. The remaining 30 wires are then sealed in one clean culture tube under an inert atmosphere and placed in inventory.

<u>Packaging for Client</u>. Immediately prior to shipping the wires to the field, the tubes containing 30 wires are removed from inventory and the wires are repackaged under an inert atmosphere in individual tubes. Ten percent of the repackaged tubes contain two wires and are called "duplicates." The collectors are packaged by double bagging in Ziploc bags in an inert atmosphere. These bags are then placed in inventory in a temperature-controlled room.

<u>Ouality Control and Ouality Assurance</u>. Prior to releasing stocked wires for a field survey, two single wires from each lot are checked for cleanliness and collecting potential. This QA/QC phase measures and documents collector preparedness when leaving the laboratory. One of these wires is analyzed without exposure in order to demonstrate that the lot is clean, and the other wire is exposed to hexane vapor for 2 seconds and then analyzed in order to verify that the charcoal is highly adsorptive. The duplicates are used when the wires return from the field. These wires help determine the required machine sensitivity and act as a measure of reproducibility.

<u>Custody Document</u>. A "custody document" accompanies each group of collectors leaving the laboratory and remains with the group until the collectors have been exposed, analyzed, and are disposed of.

B.1.2 Field Operations

<u>Locating Sample Sites</u>. Sample placement sites, usually predetermined on an accepted survey proposal, are located from a nearby, surveyable landmark using a compass and pacing or some other measuring device (e.g., pacing wheel, hip chain, or tape measure). A transit may be used for more accurate placement, but such accuracy is seldom required.

Soil Coring. Once a sample site has been established, a hole is cored to a depth of 1 to 3 feet, depending on the soil nature (sample placement depth is held constant for a given survey). This is accomplished using a variety of tools depending on the nature of the material to be cored. The holes should be vertical and as free from debris as possible. When the sampling is performed in areas covered by asphalt or concrete, a generator-powered rotary hammer drill with a carbide-tipped bit is used to drill a 1½-inch-diameter role in the cover. A hand auger is used to remove the cuttings and road base from the hole, and then to extend and deepen the hole for collector placement.

<u>Collector Placement</u>. Immediately after the hole is cored, a collector tube is removed from the Ziploc bag and the bag is resealed. The cap is then removed from the tube, and the tube is placed vertically, open end down, into the hole. The hole is then backfilled with the soil core which was removed. The cap is placed in a clean Ziploc bag and stored until collector retrieval. Collectors placed under asphalt or concrete are treated the same as those in uncovered soil, except for modifications to permit easy retrieval and to avoid potential downhole contamination from surface cuttings. To allow retrieval of these collectors, a piece of galvanized wire is twisted

around the neck of the tube and run to the surface so that the sample may be recovered by pulling the wire. Once the collector is placed in the hole, sterile sand is used to backfill the hole to a point well over the top of the sample. An aluminum plug is then placed near the top of the hole, and the remainder of the hole is filled with the sterile sand.

<u>Site Identification</u>. Each site is flagged using pin flags or ribbon flagging, and the site location is marked and numbered on a base map. A field notebook is used to record the date, collector number, site location description, soil type, and general observations.

Exposure Time. Time calibration collectors are included as part of every survey. These are QA collectors used to monitor sample loading during the survey. These collectors are placed in an area of known or suspected contamination, and sets are retrieved and analyzed at intervals to indicate the appropriate residence time for survey samples. Separate "travel blank" collectors are also included as a QC measure in every survey. These collectors are buried along with the survey collectors, but the tubes are never opened. These control collectors monitor for contamination during transport or placement.

<u>Collector Retrieval</u>. The collectors are retrieved when the time calibration collectors reveal that there has been sufficient loading of gases on the charcoal absorbent. In the field, the soil is removed until the tube is exposed. A cap is taken from the sealed Ziploc bag. The Teflon seal is checked to make sure it is seated inside the cap. The culture tube is removed from the hole and any dirt that is on the threads of the tube is wiped off with a clean cloth. In the event the tube is broken or cracked, the collector wire is transferred to a new tube using forceps. The tube is capped and sealed. All flagging material is retrieved.

<u>Collector Numbering</u>. Each tube is immediately numbered according to the scheme established in the field notes and on the base map. The collector number is written on adhesive labels which are applied to the tube cap. No two sites may have the same number.

<u>Collector Shipment</u>. Once the collectors have been retrieved, they are sealed in double Ziploc bags, wrapped, and then padded with bubble packing. Material such as Styrofoam peanuts or newsprint can introduce possible contaminants to the collectors and should not be used for packaging. The collectors, field notes, base map, and chain-of-custody document are either hand-carried back to NERI's

analytical laboratories in Lakewood, Colorado, or are shipped by overnight carrier service.

B.1.3 Collector Analysis

Numbering Check. Upon receipt of the collectors, the number on each tube is recorded and any missing or duplicated numbers are noted. A missing number generally indicates that the collector could not be retrieved. Samples with identical numbers generally cannot be used unless their true site location can be established.

Instrumentation. Thermal desorption is accomplished using a Fisher radio frequency power supply and a Curie point pyrolyzer designed by NERI and Extrel. The mass spectrometer used is an Extrel SpectrEL quadruple mass spectrometer. A few Petrex wire samples contained several compounds. NERI desorbed some of the duplicate backup wires by another technique using pyrolysis/GC/MS. This technique enabled detection of many more compounds at very low detection limits. Using this method on a number of wires, the presence of carbon tetrachloride was confirmed. In addition, several other compounds were identified as present in certain areas, including dichlorobenzene, hexachloroethane, nitrobenzene, nitrotoluene, dinitrotoluenes, dinitrophenol, dinitrobenzene, trinitrotoluene, and hexachlorobenzene. The analysis is controlled and recorded by DEC PDP 11/23 microcomputer. Following the analysis, all data are collected and archived on a PDP 11/73 microcomputer. Data for all active jobs are stored on both of the PDP 11 computers, as well as on magnetic tape. Data for all completed jobs are stored on magnetic tape in perpetuity.

<u>Calibration</u>. Mass assignment, sensitivity, and resolution are manually adjusted using a Perfluorotributylamine (PFTBA) standard. Following tuning, the spectrum of PFTBA is collected under computer control and the digital spectrum is compared to the known spectrum of PFTBA with respect to sensitivity, response linearity, and mass assignment. If more than three of the measured peaks deviate from the published values by greater than 0.1 amu, or if any single peak deviates by greater than 0.2 amu, the instrument is tuned again.

W0039213B.APP 6853-12

Instrument Parameters. The instrument is operated with the following parameters.

Vacuum	< 3x10 ⁻⁶ torr
Ionization Energy	70.0 eV
Ionization Current	12.0 mA
Desorption Time	5.0 sec
Desorption Temperature	358°C
Number of Scans/Sample	30
Scan Rate	1,250 amu/sec

Mass Spectrometer Analysis and OA/OC. Each collector wire is analyzed in random order. The entire group of survey collectors are analyzed as one run without interruption from other surveys.

The organic gases adsorbed on the carbon are thermally desorbed from the carbon, separated according to ion mass, counted, and a mass spectrum of masses from 15 to 240 is obtained.

Periodic (approximately every 20 samples) machine background analyses are performed as a QC measure to assure minimal influence from internal communication. If there are peaks that are not related to atmospheric gases, the supervisor is notified and the mass spectrometer is shut down and cleaned as necessary.

A written sample number record is kept during the analysis to prevent accidental cross-numbering. The mass spectrometer control program prompts the operator with a warning if a sample number is entered that has already been used. The operator then checks the current number, along with the disk storage location of the previously entered number, to identify the true numbering situation.

<u>Data Filing</u>. The raw data file generated by the sample analysis is labeled for storage under a unique file name.

<u>Detection Limits</u>. The sensitivity of the Petrex method can be estimated by making the assumption that there is free soil gas to be sampled continuously in the vadose zone. We have determined by the spiking of Petrex wires that we have the following mass spectrometric system detection limits.

TYPICAL CHLORINATED SOLVENTS	PETREX WIRE	APPROXIMATE FIELD (25 DAYS)
Tetrachloroethylene	10 ng	15 ppt
Trichloroethylene	10 ng	15 ppt
trans-1,2-Dichlorethylene	50 ng	60 ppt
Dichloromethane	25 ng	60 ppt
Trichloromethane	10 ng	30 ppt
Tetrachloromethane	20 ng	30 ppt
Vinyl Chloride	50 ng	200 ppt

ng = nanograms; ppt = parts per trillion

Because we put the entire wire into the mass spectrometer, 99 percent of the passively adsorbed compounds end up in the quadrapole for detection. If we assume a sampling rate of the Petrex collector to be approximately 10 cubic centimeters per minute, we can calculate the approximate field (25 days) sensitivity.

The working range of the methodology relates somewhat to the performance of the mass spectrometer and the linear range of the detector system. When dealing with individual ions, we have a 10⁵ ion count working range and a saturation value of approximately 2.4x10⁵. We can correct target ions for saturation in clusters by using adjacent ratios to extend the target ion above the 2.4x10⁵ saturation range. Generally, uncertainties in these mass spectrometric measurement and detection issues are not a major contributor to the mapping of ion flux or our interpretation of compound anomalies. The typical flux or ion count range for soil gas concentration is 10 to 5,000 ng on wire adsorption or 10 ppt to 2.4 parts per billion (ppb) for an average 25-day survey.

If you review our calibration procedure, you will see that much emphasis is put on FC43 tuning ratios. We assure reference tuning ratios which are equivalent to what is recommended for USEPA work. Representative duplicate wires are used to establish an initial working range for a set of target compounds. Then, those conditions are held constant throughout the run.

W0039213B.APP 6853-12

B.1.4 Data Interpretation and Presentation

Map Generation. The sample location maps are created by placing the field base map on a digitizing board and entering each site as an X-Y coordinate relative to some surveyable feature at the site. The relative ion counts for each compound can then be plotted at the sample locations. Cultural and topographic features can also be digitized onto the map as reference points.

Compound Identification. The mass spectrum that is drawn for each sample is compared to a library of mass spectra derived from known VOCs. Several thousand pure compound spectra have been developed by the Bureau of Standards and are available for spectra comparison. NERI has also developed its own library of spectra through headspace analysis of pure compounds using the Petrex wires. Once a compound has been identified in this manner, the ion current or "flux" for this compound is defined as the total ion current for the "parent peak" of that compound.

<u>Relative Flux Determination</u>. The process of determining ion currents (relative intensities) of indicator peaks is computerized. All ion current data are extracted from the original data file and are processed for identification.

The relative ion current intensity (relative intensities) of the gases that are desorbed from the collectors are matched with sample locations on a map of the survey area. These relative intensities are useful for inferring the areal extent of contamination and relative differences in the concentrations of the compounds in the soil or groundwater. This can aid in determining the direction of source areas or direction of movement of contamination.

These surface collections and analyses <u>cannot</u> be used to determine the depth to the source contaminants or the precise concentration at depth. Because compounds can be differentiated by their spectra, analyses from the carbon collectors can be used to help differentiate multiple compounds and multiple source areas within a single survey.

<u>Data Interpretation</u>. Once the relative intensities for the compound in question are mapped, the data can be contoured to reveal those areas with "hot spots" and the orientation of plume migration. All other available data, such as geologic setting, soil types, groundwater conditions, type of contaminant, site history, and other factors are taken into account as the interpreter draws conclusions. One conclusion may be

that not enough data are available, and a follow-up survey may be recommended to further clarify the interpretation.

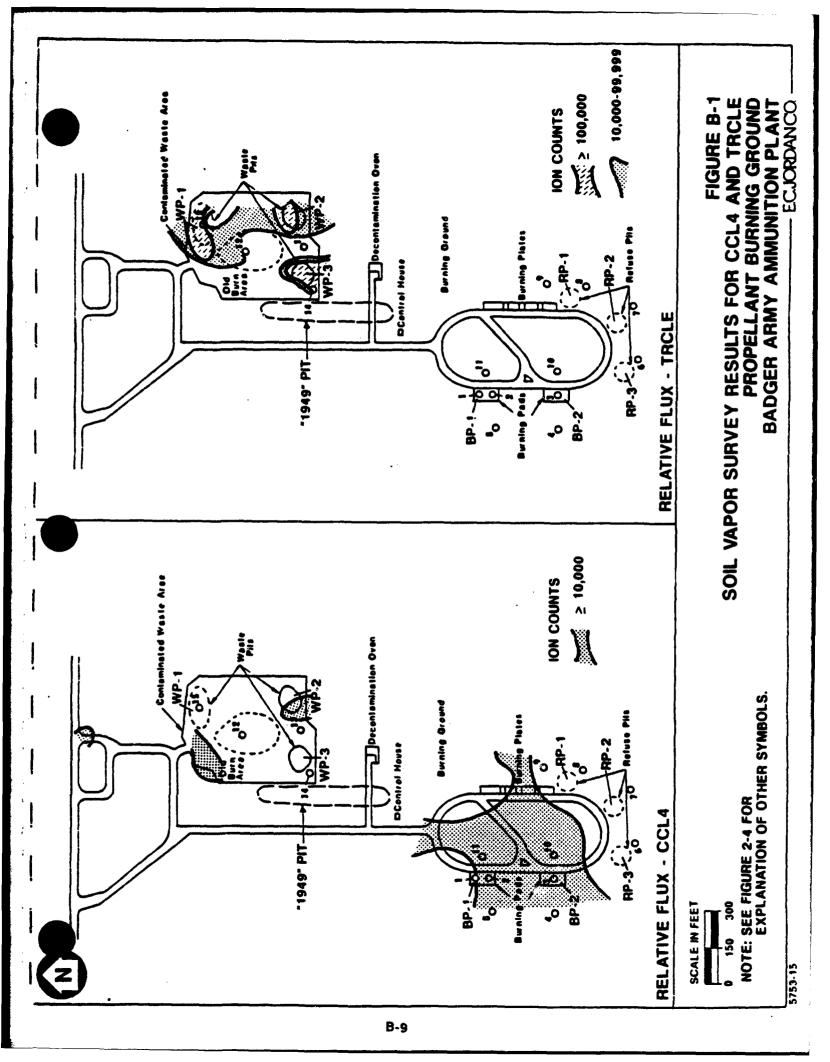
<u>Data Presentation</u>. Once the data has been compiled, interpreted, and mapped, a report describing the Petrex technology, the survey design and results, interpretations, conclusions, and recommendations is produced for the client's use. Also, the maps are printed which display compounds of the client's specifications. These reports and maps are for the client's use only, and no report or map is released to anyone else without prior written consent of the client. This confidentiality policy is never breached.

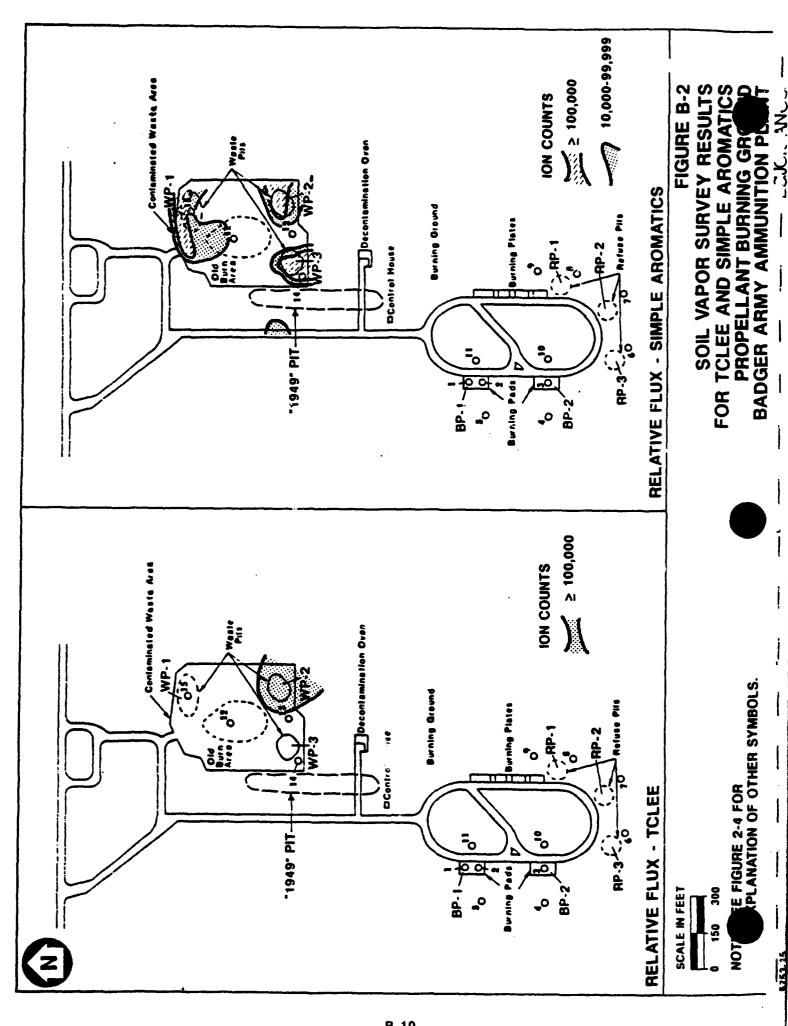
B.1.5 Interpretation of Petrex Maps

As previously stated, the relative intensities for any compound at one sample location can only be compared to another location within the same survey for the same compound. Relative intensities of different compounds cannot be compared to each other. Also, the relative intensities of one survey cannot be compared to the relative intensities of any other survey, even between two surveys at different times of the year over the same site. Since the data are non-quantitative, only the flux patterns of a survey or the relative difference between flux values of two samples from the same survey should be considered during interpretation. However, the same "hot spots" and plumes should contour in the same place over multiple surveys at a given site, allowing for migration.

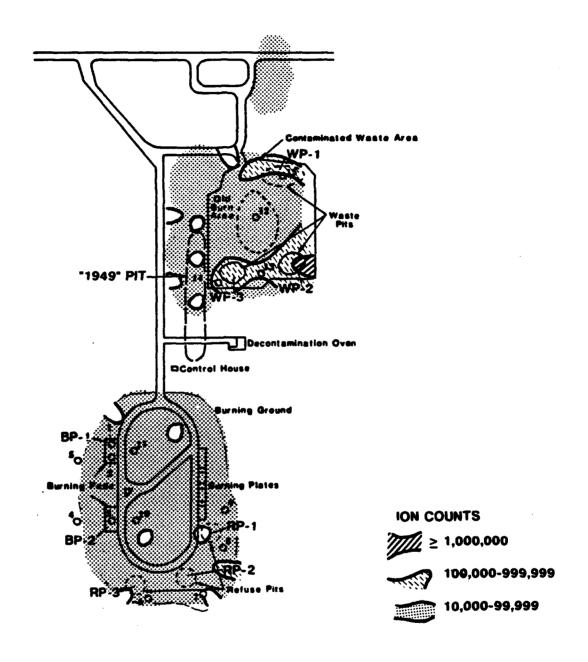
B.2 RESULTS

The results of the soil vapor survey are presented in the following figures. Figures B-1 through B-4 illustrate areas of elevated relative flux concentrations for various hydrocarbons and chlorinated hydrocarbons in the Propellant and Deterrent Burning Grounds. Figures B-5 through B-12 present the relative ion counts at each sample location for the specific compound being evaluated. The ion counts were generated through analyses of mass spectra data generated for each sample.









RELATIVE FLUX - COMBINED HYDROCARBONS

NOTE: SEE FIGURE 2-4 FOR EXPLANATION OF OTHER SYMBOLS.

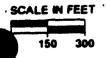
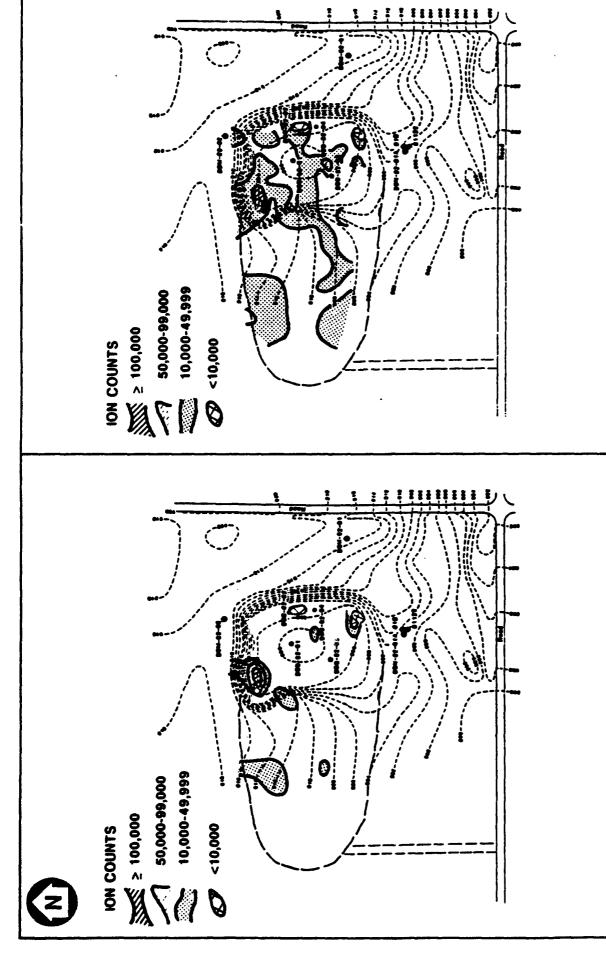


FIGURE B-3
SOIL VAPOR SURVEY RESULTS
FOR COMBINED HYDROCARBONS
PROPELLANT BURNING GROUND
BADGER ARMY AMMUNITION PLANT

- ECJORDANCO



RELATIVE FLUX - ALKANES

RELATIVE FLUX - SIMPLE AROMATICS

SCALE IN FEET

SOIL VAPOR SURVEY RESULTS FOR SIMPLE AROMATICS AND ALKANES DETERRENT BURNING GROUND BADGER ARMY AMMUNITION FOR THE PROPERTY AMMUNITY AMMUNITY

NOTIFE FIGURE 2-5 FOR XPLANATION OF OTHER SYMBOLS.

5753-15

RELATIVE FLUX COMBINED HYDROCARBONS
PROPELLANT BURNING GROUND
BADGER ARMY AMMINITION PLANT

-ECJORDANCO

20.00

NOTE: SUBMITTED TO E.C. JORDAN ON MANCH 23, 1989 BY NEW OF LAKEWOOD, COLORADO.

LILL PETREX 14 F4 10,000 - 99,999 LEGEND: ION COUNTS × 100,000 9 W

8783-18

NOTE: SUBMITTED TO E.C. JORDAN ON MARCH 23, 1969 BY NEW OF LAKEWOOD, COLORADO.

FIGURE B-7
RELATIVE FLUX CARBON TETRACHLORIDE
PROPELLANT BURNING GROUND
BADGER ARMY AMMUNITION PLANT -ECJORDANCO HILL PETREX NOTE: SUBMITTED TO E.C. JORDAN ON MANCH 23, 1989 BY NEW OF LAKEWOOD, COLONADO. LEGEND: ION COUNTS > 10,000 X (1) 8783-18

B-15

ILLE PETREX COMMON MATRICAL MAN Δ ION COUNTS LEGENO: Д FIGURE 8-8
RELATIVE FLUX TETRACHLOROETHYLENE
PROPELLANT BURNING GROUND
BADGER ARMY AMMUNITION PLANT
ECJORDANCO

NOTE: SUBMITTED TO E.C. JONDAN ON MANCH 23, 1969 BY NEW OF LAKEWOOD, COLONADO.

RELATIVE FLUX TRICHLOROETHYLENE PROPELLANT BURNING GROUND BADGER ARMY AMMUNITION PLANT FIGURE B-9

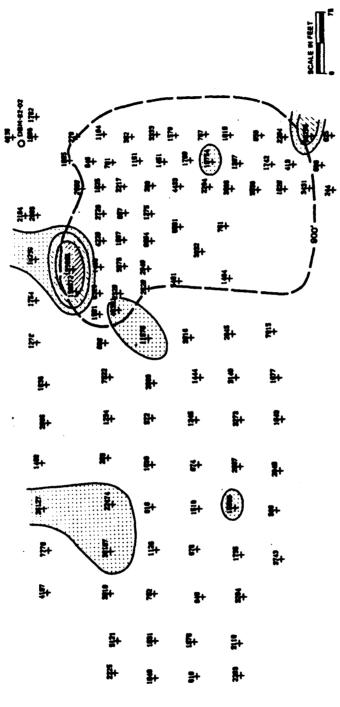
10,000 - 99,999 ION COUNTS 2 100,000 LEGEND

NOTE: SUBMITTED TO E.C. JONDAN ON MANCH 23, 1969 BY NERI OF LAKEWOOD, COLORADO.

-ECJORDANCO

W

IN IN PETREX



LEGEND: ION COUNTS 2 100,000 A 90,000 - 90,999

10,000 - 40,000

MOTE: SUBMITTED TO E.C. JORDAN ON MARCH 23, 1969 BY NEW OF LAKEWOOD, COLORADO.

DBN-87-61A ODBN-82-018 O S1122

FIGURE B-10

RELATIVE FLUX SMPLE AROMATICS DETERRENT BURNING GROUND BADGER ARMY AMMUNITION PLANT

ECJORDANCO

1785-18

(3)

FIGURE B-11
RELATIVE FLUX ALKANES
DETERRENT BURNING GROUND
BADGER ARMY AMMUNITION PLANT

interior series -**Ş**+ 8+ **š**+ Ěŧ

DBN-82-01A O DBN-82-01B

19,000 - 41,999

LEGEND:

MOTE: SUBMITTED TO E.C. JONDAN ON MARCH 23, 1989 BY NEW OF LAKEWOOD, COLORADO.

(2)

IN PETREX

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DEN-62-01A OPEN-62-01B O O S 11 22

ION COUNTS 250 - 996 ≥ 1,000 LEGEND:

NOTE: SUBMITTED TO E.C. JONDAN ON MARCH 23, 1949 BY NERI OF LAKEWOOD, COLORADO.

FIGURE B-12 RELATIVE FLUX TRICHLOROETHYLENE DETERRENT BURNING GROUND BADGER ARMY AMMUNITION PLANT -ECJORDANCO

(2)

APPENDIX C SURFACE GEOPHYSICAL SURVEY

W0039213CAPP 6853-12

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APPENDIX C: SURFACE GEOPHYSICAL SURVEY

C.1 TECHNIQUES

Terrain conductivity (TC) measurements, ground-penetrating radar (GPR), and magnetometer profiling were performed at Badger Army Ammunition Plant. techniques are described in the following subsections.

C.1.1 Terrain Conductivity Measurements

C.1.1.1 General. TC surveys, also referred to as electro-magnetic induction (EMI) surveys, have traditionally been used in mineral exploration for tracing conductive ore bodies (i.e., massive sulfides). More recently, conductivity surveys have been widely used for tracing conductive contaminant plumes in groundwater. Leachate from municipal landfills tends to be much more conductive than naturally occurring groundwater. Accordingly, the shape, extent, and relative impact of a plume can be studied with TC surveys. Such surveys have also been successfully used in studying some organic contamination in soil and groundwater since the conductivity of most organic chemicals is much lower than naturally-occurring soils and groundwater.

C.1.1.2 Data Acquisition. Data generated during field surveys were stored in a numerical data logger and were recorded on log books in the field. Since the instrument never comes in contact with the ground, data acquisition is more rapid than conventional, galvanic, earth resistivity surveys. However, quantification of conduc ity data to yield a layered-earth solution is more difficult than with conventional earth Bistivity.

The EM-31 DL utilized at BAAP is a widely used TC meter manufactured by Geonics, Ltd., in Mississauga, Ontario. This instrument, which has proven to be rapid-reconnaissance exploration tool, is used to assess the conductivity values for soil and rock materials.

C.1.1.3 Principles. The instrumentation for TC surveys consists of a transmitter and receiver which operates in the following manner. The transmitter is energized by an alternating current producing a magnetic field, designated as the primary field, Hp. This artificial magnetic field induces small electric currents to flow in the earth which, in turn, produce a secondary magnetic field, Hs. This secondary magnetic field is complexly related to the transmitter/receiver separation distance and to the operating frequency of the transmitter, both of which are selected by the operator. The ratio of the secondary magnetic field to the primary magnetic field (Hs/Hp), under conditions fulfilled in the field, is linearly

W0039213C.APP 6853-12 proportional to the TC. This ratio is measured by the receiver and converted into conductivity values in units of millimhos per meter.

C.1.1.4 Interpretation. Although it is difficult to define the thicknesses and "true" conductivity of individual subsurface layers, the instrument precisely measures the "apparent" conductivity of a volume of underlying earth materials. The apparent conductivity is comprised of the sum of the contributions from each layer that is "sampled" by the transmitter-receiver array. The volume (and therefore the depth) of earth materials sampled increases with increasing separation between the transmitter and receiver. This separation is fixed at 3 meters with the EM-31.

The instrument can be used in either the horizontal dipole or vertical dipole mode. Selection of the operational dipole mode depends on the depth of sampling desired, and the desired sensitivity of the instrument to materials at various depths, relative to the transmitter-receiver coil separation. Table C-1 shows the relationship of the vertical and horizontal dipole modes and coil separation to the effective depth of exploration.

The relative response of the instrument to materials at various depths can be estimated by examining Figure C-1, which shows a comparison of the relative responses for vertical and horizontal dipoles. The vertical axis describes the relative contribution to the secondary magnetic field, arising from a thin layer at a given depth, \underline{z} . The horizontal axis shows how this response varies as a function of the ratio $(\underline{z}/\underline{s})$, where \underline{z} is the depth of the thin layer described previously and \underline{s} is the transmitter/receiver separation.

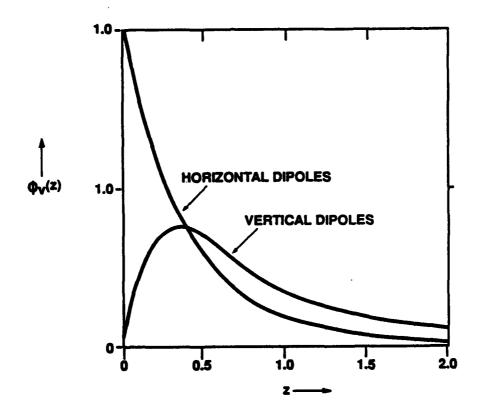
Figure C-1 demonstrates that in the vertical dipole mode, the contribution to the secondary magnetic field from near-surface materials is very small but reaches a maximum at a depth \underline{z} of approximately 40 percent of \underline{s} . The contribution is significant, although diminished, at a depth of 150 percent of \underline{s} . This depth represents the effective depth of exploration in the vertical dipole mode (see Table C-1).

In the horizontal dipole mode, the contribution to the secondary magnetic field arising from near-surface materials, is a maximum and decreases with increased depth. The contribution is also significant at a depth of about 75 percent of s. This depth represents the effective depth of exploration in the horizontal dipole mode (see Table C-1). The location and results of TC surveys at the Deterrent Burning Ground and Landfill 1 are discussed in Section 6.1.

TABLE C-1 TERRAIN CONDUCTIVITY MEASUREMENTS EFFECTIVE DEPTH OF EXPLORATION

REMEDIAL INVESTIGATION BADGER ARMY AMMUNITION PLANT

INSTRUMENT	COIL SEPARATION	VERTIGAL DIPOLE	HORIZONTAL DIPOLE
EM 31	3m	4.5m	2.25m
EM 34-3	10m	15m	7.5m
	20m	30m	15m
	40m	60m	30m



NOTE: "Øv(z)" is the relative contribution to the secondary magnetic field intensity from material in a thin layer (dz) located at (normalized) depth "z."

"z" is the depth of the thin layer (dz) divided by the intercoil spacing between transmitter and receiver.

FIGURE C-1
TERRAIN CONDUCTIVITY SURVEY
COMPARISON OF RELATIVE
RESPONSES FOR VERTICAL
AND HORIZONTAL DIPOLES
REMEDIAL INVESTIGATION
BADGER ARMY AMMUNITION PLANT

_ ABB Environmental Services, Inc.

C.1.2 Ground Penetrating Radar Profiling

C.1.2.1 Introduction. The GPR technique uses high frequency radio waves to determine the presence of subsurface objects and structures. Energy is radiated downward into the subsurface from an antenna which is pulled slowly across the ground at speeds varying from about 0.25 to 5 mph, depending upon the amount of detail desired and the nature of the target. The radio wave energy is reflected from surfaces where there is a contrast in the electrical properties of subsurface materials. These surfaces may be naturally-occurring geologic horizons (soil layers, changes in moisture content, voids and fractures in bedrock) or manmade (buried utilities, tanks, drums, etc.). The reflected energy is processed and displayed as a continuous strip chart recording of distance versus time (where time can be thought of as proportional to depth).

The depth of penetration of a GPR system is highly site-specific, and depends, among other factors, on (1) the soil types at the site (clean sands are best), (2) moisture conditions (dry is best), and (3) the frequency of the antenna (the lower the frequency, the deeper the penetration, and the less the resolution capability).

Typical applications for GPR include delineating the boundaries of buried hazardous waste materials and the perimeters of abandoned landfills; finding steel reinforcement bars and voids in concrete structures; recording the depth of geological interfaces, bedrock, and coal seams; locating and mapping buried utilities; bottom and shallow subbottom profiling on lakes; and determining glacial ice stratification and thickness.

C.1.2.2 Principles. The radar system consists of a control unit, an antenna assembly (transmitter/receiver), and a recording device for analog field recordings. A tape recording unit may also be present for further data processing after field activities are completed. The antenna transmits electromagnetic (EM) pulses of short duration into the ground. The pulses are reflected from geologic or man-made surfaces and are picked up by the receiver which transmits the signals to the control unit for processing and analog display. Shallow objects appear near the top of the strip chart recording (less time elapsed between the outgoing pulse and the return of reflected energy), whereas deeper objects appear further down the recording (more time elapsed).

The time required for the EM pulse to traverse the path down to and back from the reflecting medium is measured in nanoseconds (ns), where 1 ns equals $1x10^{-9}$ seconds. The two-way travel time is proportional to the burial depth of the reflecting medium and is dependent upon the dielectric properties of the medium through which the EM pulse

travels. The dielectric properties of a medium are related to the moisture content and composition of a material.

Figure C-2 depicts the relationship between a single EM pulse generated by the controller and the resulting strip chart recording which would result from many such EM pulses (by permission of GSSI, Inc.). Figures C-3 and C-4 illustrate various features as they would appear on a GPR recording.

The propagation velocity of the EM pulse is determined by the relative dielectric permittivity (er) of the material through which the pulse travels. The er is a measure of the degree to which a medium can resist the flow of the EM pulse: the higher the er, the lower the resistance to flow, and vice versa. For most earth materials and rocks, the er does not exceed 10 and is always greater than 1, the value for a vacuum. Table C-2 gives typical permittivity values for commonly encountered materials. The er is related to the propagation velocity by the formula

(1) er =
$$(c/Vm)^2$$
,

where "c" is the propagation velocity in free space $(3x10^8 \text{ meters per second or approximately 1 foot per ns)}$, and Vm is the propagation velocity through a material. It follows that $e^{0.5} = c/Vm$ or $1/Vm = [e^{0.5}]/c$. Since c 1 ft/ns, then

(2)
$$1/Vm er^{0.5}$$
,

where units are in ns/ft (one-way travel time).

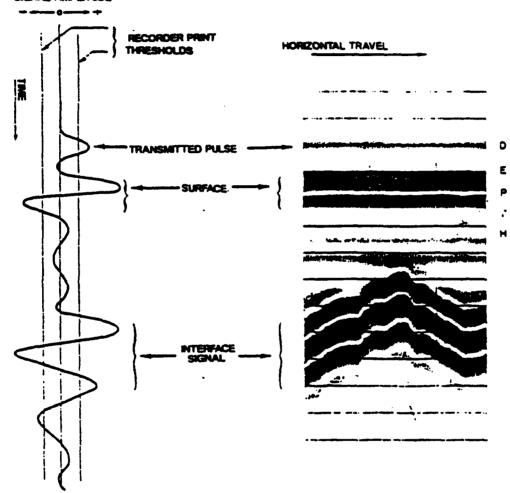
Formula (2) gives a method for estimating the propagation velocity for a medium (and therefore the depth to a reflecting horizon) if the soil conditions are known. If they are unknown or their properties cannot be estimated accurately enough, a reflector of known depth can often be used to calibrate the GPR recordings to site conditions.

C.1.3 Magnetometer Survey

C.1.3.1 Introduction. The magnetometer survey is a versatile, relatively inexpensive, geophysical exploration technique. The focus of national attention on the hazardous waste problem has prompted the routine use of magnetometers for locating repositories of buried (drummed) wastes. Locating and quantifying these materials is essential to any remediation effort, and magnetometer surveys can provide an extra measure of safety to those personnel involved in the clean-up activities.

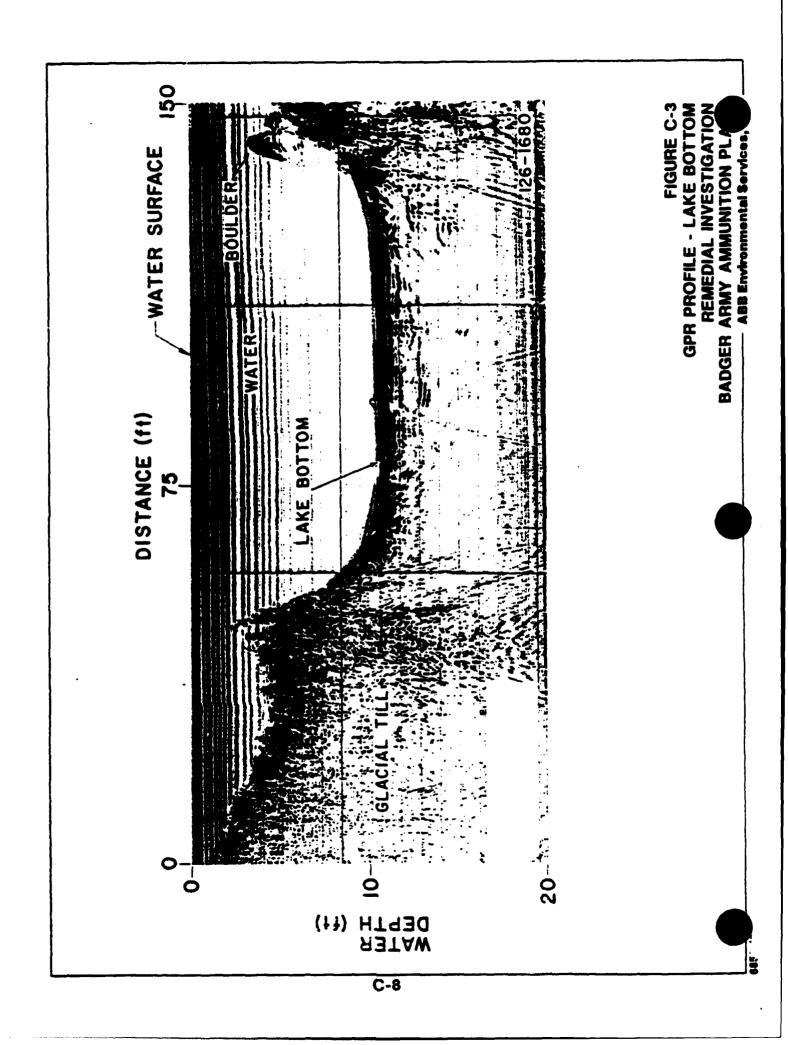
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SIGNAL AMPLITUDE



(A) SKETCH OF A SINGLE PULSE AND REFLECTIONS . AS SEEN BY THE RECEIVER (B) EXAMPLE OF PROFILE INFORMATION AS DISPLAYED BY THE GRAPHIC RECORDER

FIGURE C-2
TYPICAL GPR SYSTEM DATA
REMEDIAL INVESTIGATION
BADGER ARMY AMMUNITION PLANT



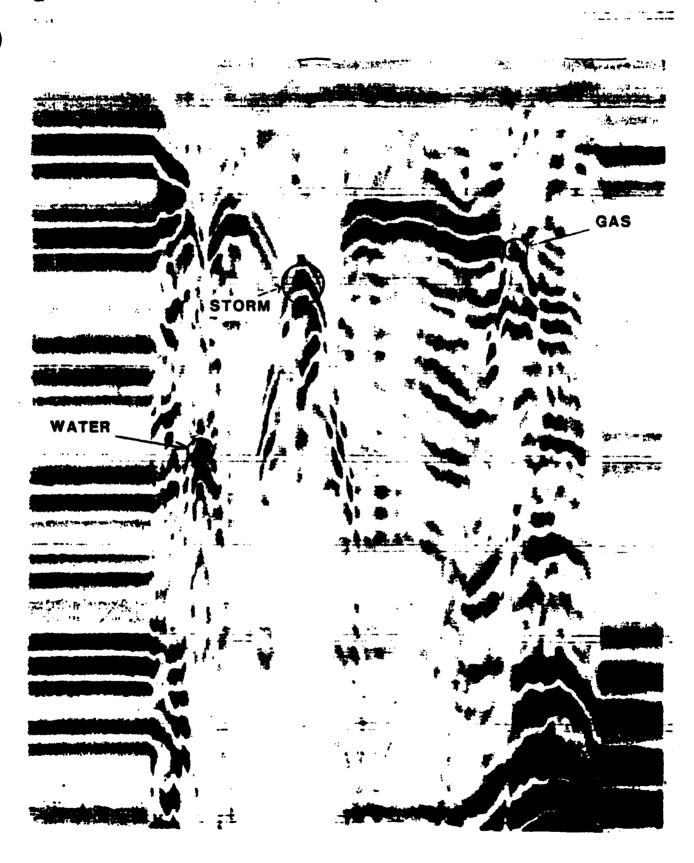


FIGURE C-4
GPR PROFILE - BURIED UTILITIES
REMEDIAL INVESTIGATION
BADGER ARMY AMMUNITION PLANT
ABB Environmental Services, Inc.

TABLE C-2 APPROXIMATE VHF ELECTROMAGNETIC PROPERTIES OF VARIOUS MATERIALS*

REMEDIAL INVESTIGATION BADGER ARMY AMMUNITION PLANT

MATERIAL	RELATIVE DIELECTRIC PERMITTIVITY	PULSE VELOCITY (NS/FT)	
air	1	1	
freshwater	81	9	
seawater	81	9	
sand (dry)	4-6	2-2.4	
sand (saturated)	30	5.5	
silt (saturated)	10	3.1	
clay (saturated)	8-12	2.8-3.3	
average dirt	16	4.0	
dry sandy coastal land	10	3.1	
marshy forested flatland	12	3.5	
rich agricultural land	<i>15</i>	<i>3.9</i>	
pastoral land, hilly, forested	13	3.6	
freshwater ice	4	2.0	
permafrost	4-8	2.0-2.9	
granite (dry)	5	2.2	
limestone	7-9	2.6	
concrete	6.4	2.5	
asphait	3-5	1.7-2.5	

^{*} Modified from Geophysical Survey Systems, Inc.

C.1.3.2 Principles. At BAAP a "proton precession" type magnetometer was employed. This device utilizes the precession of spinning protons of hydrogen atoms in a sample of hydrogen-rich fluid (e.g., kerosene, alcohol, or water) to measure the total magnetic field intensity. Protons spinning in an atomic nucleus behave like tiny magnetic dipoles which can be aligned (polarized) by an external magnetic field. The protons are initially aligned parallel to the earth's field. A second, much stronger magnetic field is produced approximately perpendicular to the earth's field by introducing electric current through a coil of wire. The protons become temporarily aligned with this stronger field. When this stronger field is removed, the protons tend to realign themselves with the earth's field, causing them to precess about this direction at a frequency of approximately 2,000 Hz. The precessing protons will generate a small electric signal in the same coil used to polarize them with a frequency proportional to the total magnetic field intensity and independent of the coil orientation. By measuring the signal frequency, one can obtain the absolute value of the total earth's field intensity to an accuracy of 1 gamma or better. The total magnetic field value measured by the proton precession magnetometer is the net vector sum of the ambient earth's field and any local induced and/or remanent (permanent) perturbations.

C.1.3.3 Interpretation. For typical manmade iron or steel objects, the approximate depth of burial and the amount of metal that produces an observed magnetic perturbation (or anomaly) may be quantified. The size of the anomaly (T) can be expressed as:

$$T = M/r^n$$

where "M" is the magnetic moment of the source "r" is the depth to the source, and "n" is a measure of the rate of decay with distance (n = 3 for a dipole source and 2 for a monopole source).

Assuming a dipole source, the weight of a metal object (in pounds) can be expressed by the following relation:

Weight =
$$(T*r^3)/M$$

where "M" is the magnetic moment per pound of iron and varies from approximately 175 to 1750, "r" is the depth in feet (below the sensor), and "T" is the anomaly amplitude in gammas.

The depth, "r", of a magnetic source can be estimated by a number of techniques, but perhaps the simplest is by the "half-width" rule. This states that for simple anomaly sources, the depth to the center of the anomaly is equal to the "half-width" of the anomaly. The half-

W0039213CAPP 6853-12

width is the horizontal distance between the maximum value of the anomaly and the point at which the value is half the maximum value (Figure C-5).

A further refinement in magnetic studies is permitted with the addition of vertical gradient measurements. This involves the simultaneous acquisition by two sensors of two values of the total field. The sensors are mounted on a staff that is held vertically during a measurement. A known distance (commonly half or 1 meter) separates the sensors on the staff. The vertical gradient value is derived by obtaining the difference between the total field values of the lower and upper sensors divided by the distance between them. Vertical gradient measurements tend to be more sensitive to the presence of near-surface metal objects than total field values alone.

There are commercially available magnetometers that record field data in an internal memory, which can be "dumped" at the completion of field activities onto a personal computer. These instruments can record the total field value, the vertical gradient, the time and date of the measurement, and the station location (input by the user), as well as a number of parameters that permit an evaluation of data quality. When vertical gradient measurements are the primary focus of a survey, the diurnal variation is inconsequential, because any variation affects the two sensors on the magnetometer sensor staff equally.

C.2 RESULTS

The results of the TC, GPR, and magnetometer surveys conducted at Landfill 1, the Deterrent Burning Ground, and the 1949 Pit are presented in this section.

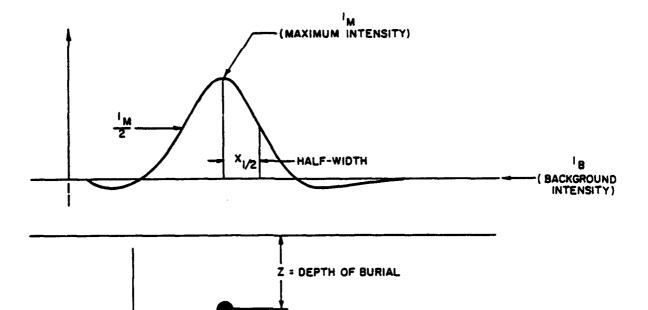
C.2.1 Landfill 1

A geophysical survey, consisting of both TC measurements and GPR profiling, was conducted at Landfill 1. The purpose for this work was to accurately define the boundaries of the landfill. A 100- by 100-foot survey grid was established prior to the start of field work to serve as lateral control for the measurements to follow. Jordan accomplished this with a compass and fiberglass tape and tied the survey grid into landmarks, where possible.

A Geonics EM-31DL Terrain Conductivity Meter was used for the TC survey. Measurement stations were established every 20 feet within the survey area, and all stations were referenced to the 100- by 100-foot grid. Measurements were recorded on a digital data logger, and included both the quadrature- phase and in-phase components of the induced magnetic field. The quadrature- phase component gives the TC value in millimhos per

W0039213C.APP 6853-12

DEPTH CALCULATION/METAL QUANTITY FOR TOTAL FIELD MEASUREMENTS:



MAGNETIC SOURCE

T = MAGNETIC ANOMALY INTENSITY

= MAXIMUM ANOMALY INTENSITY MINUS BACKGROUND INTENSITY

$$= \frac{M_{fps}}{r^3} = \frac{1.75 \times 10^2 \text{ to } 1.75 \times 10^3}{(1 \text{ to } 2) r^3}$$

where "M_{fps}" is the magnetic moment per pound of iron and "r" is the distance between the magnetometer sensor and the object (the depth of burial) "z" is equal to "r" minus the height of the sensor above the ground.

DEPTH CALCULATION FOR GRADIOMETER MEASUREMENTS

$$r = \frac{-nT}{dT}$$

where "n" is the "falloff" factor and generally varies from I to 2, depending on the magnetic source, "r" is the separation between the midpoint between the two sensors and the object.

FIGURE C-5
MAGNETOMETER DATA INTERPRETATION
REMEDAL INVESTIGATION
BADGER ARMY AMMUNITION PLANT

ABB Environmental Services, Inc.

meter. The in-phase component, used primarily for calibration purposes on the EM-31, is significantly more sensitive to metallic objects and, hence, is useful for looking for buried metallic objects, such as tanks and drums. Data from the in-phase component may be thought of as being equivalent to a metal detector survey.

A GSSI SIR System III GPR system with 500 MHz antenna was used for the GPR survey. GPR traverses were make at 10-foot intervals in three separate areas within Landfill 1.

The results of the TC and GPR surveys are presented as Figures C-6 through C-8. Figure C-6 presents the TC quadrature-phase contours (ground conductivity). Figure C-7 portrays the TC in-phase contours (sensitive to metallic objects). Figure C-8 presents the landfill perimeter as mapped by these survey results (including the GPR results).

The only significant anomaly on Figure C-8 is an east-west-oriented elliptically-shaped TC "high" in the central portion of the study area (labeled TC-H3). TC-H3 is undoubtedly caused by the presence of metallic refuse and the production of electrically conductive leachate by infiltration of surface water runoff.

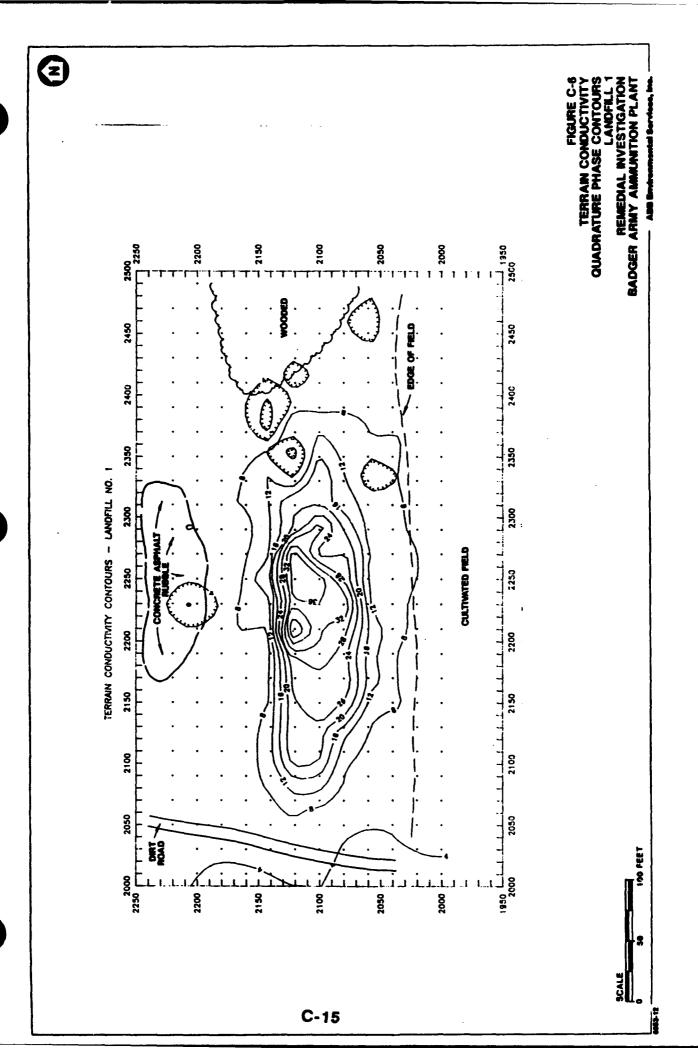
GPR traverses were located as indicated on Figure C-8. The transition across the boundary separating natural sediments from the refuse disposed in the landfill is characterized by strong, shallow reflections typical of landfills (Refuse typically retains moisture which generates electrically conductive leachate, producing a large contrast in the electrical properties of subsurface materials). The landfill boundary mapped during the field survey is indicated on Figure C-8. There is a striking similarity between the boundary mapped by GPR and the TC contours presented in Figure C-6 (the 8 millimho per meter contour has been superimposed onto Figure C-8 for illustrative purposes.

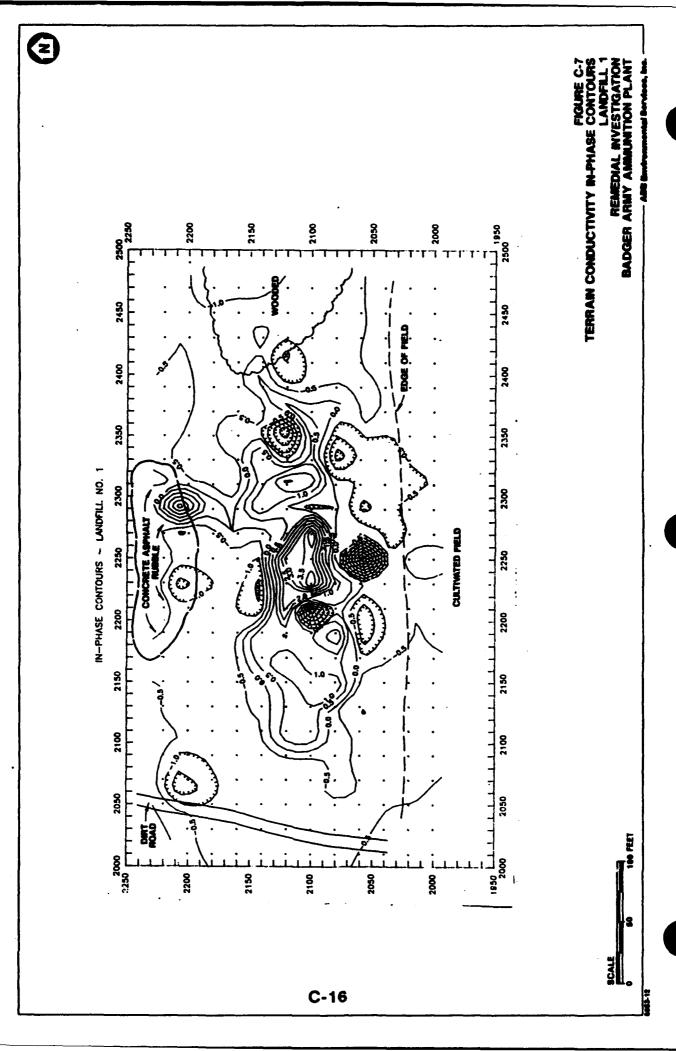
C.2.2 Deterrent Burning Ground

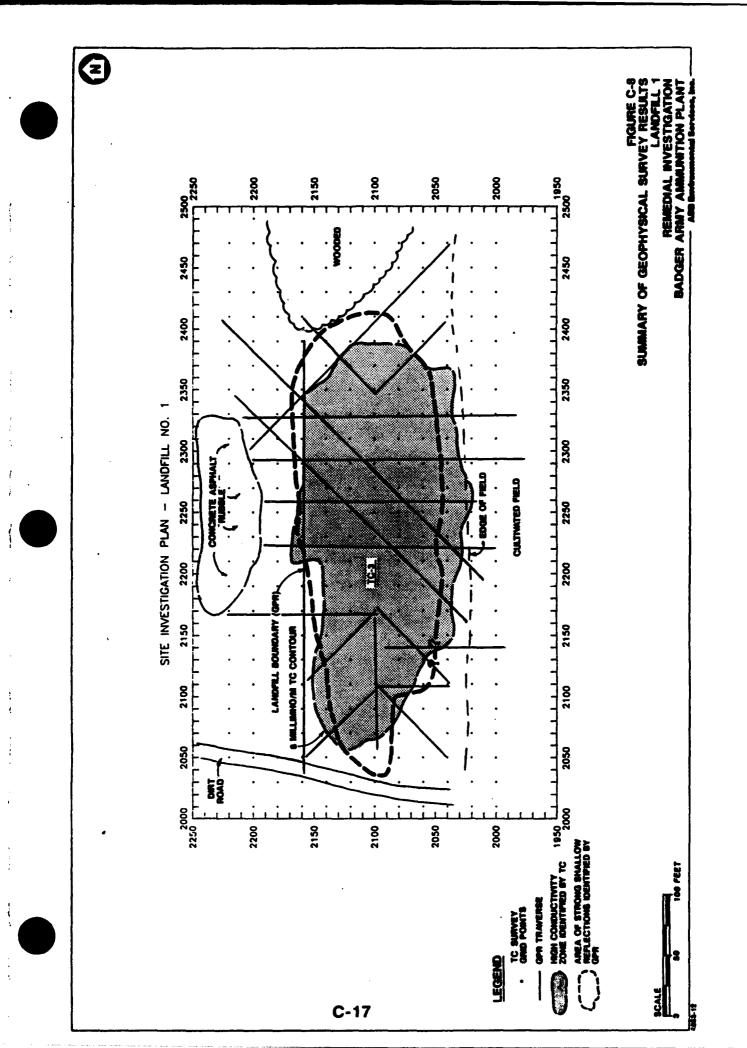
The purpose for geophysical surveys at the Deterrent Burning Ground was to locate former pits in which the burning of deterrent took place. Field methodology and instrumentation for the surveys were discussed in Section C.2.1. Information derived from these field activities was used for planning the locations for explorations, including both monitoring wells and test pits.

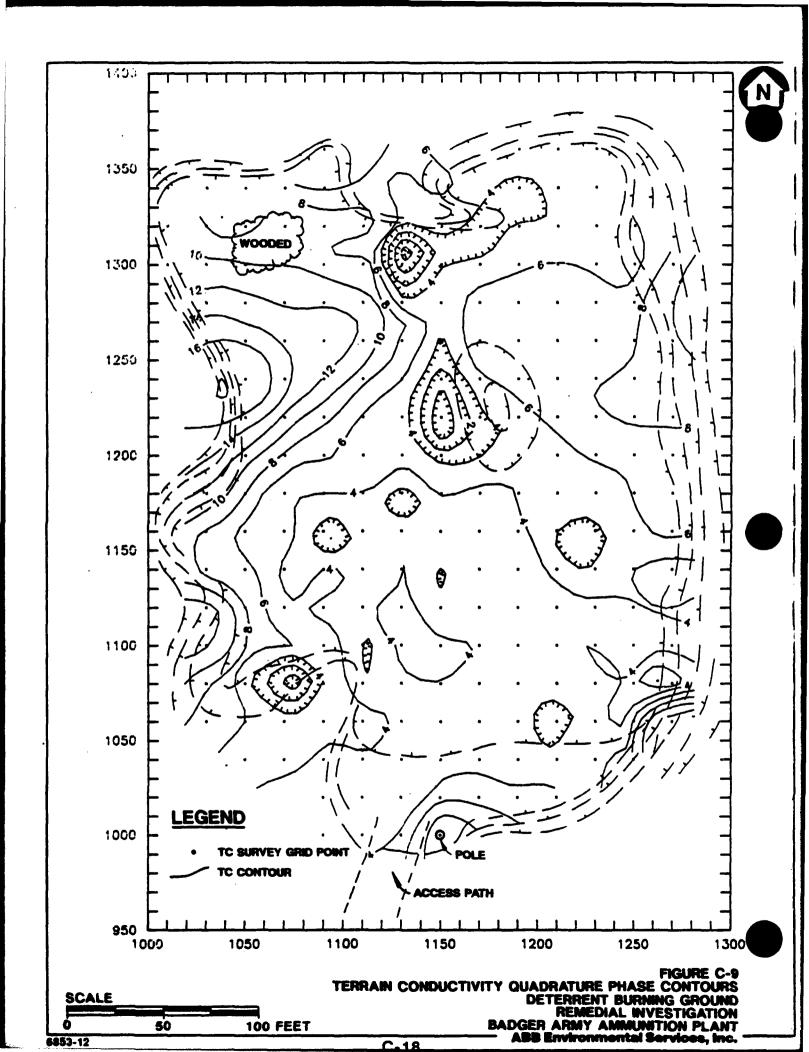
The results of the geophysical surveys at the Deterrent Burning Ground are presented in Figures C-9 through C-11. Figure C-9 presents the TC quadrature- phase contours (ground conductivity). Figure C-10 portrays the TC in-phase contours (more sensitive to the

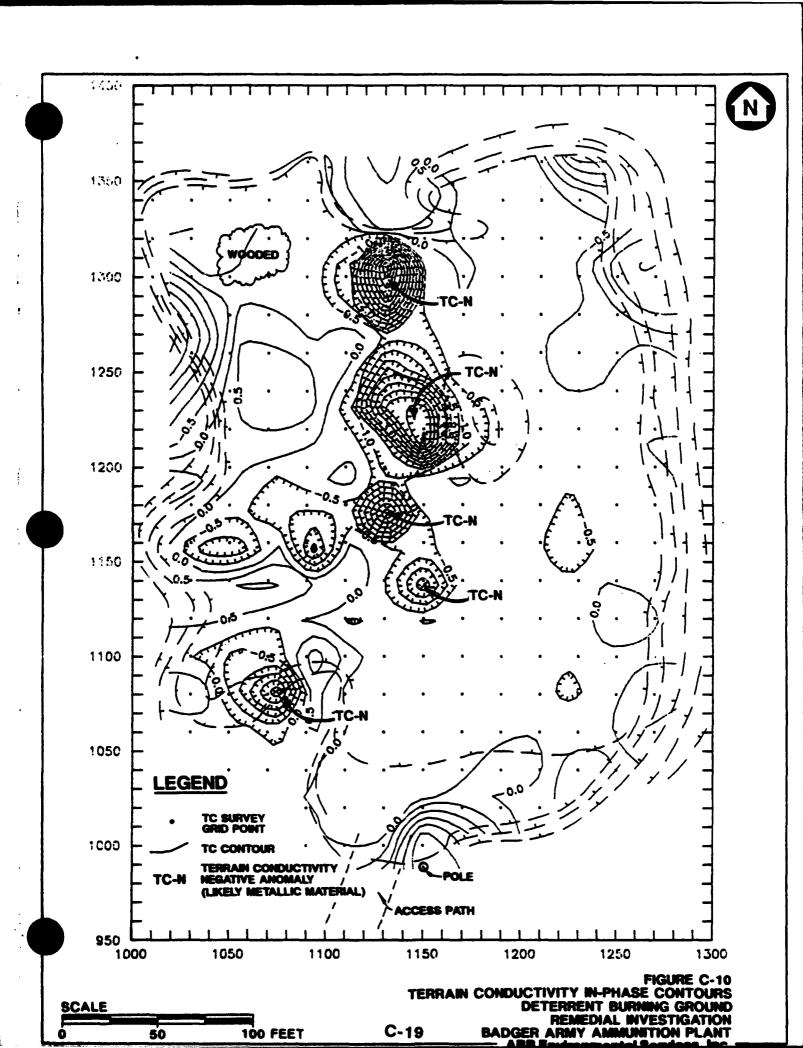
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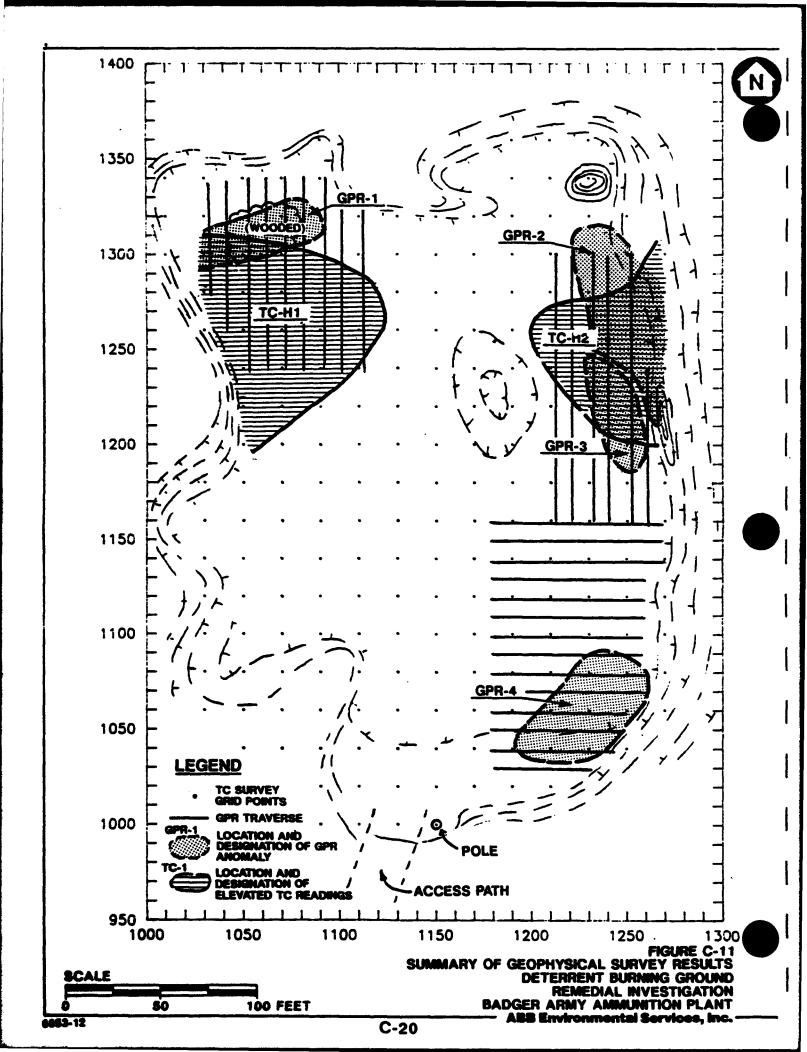












presence of metallic objects). Figure C-11 summarizes the subsurface features which were mapped (including the GPR results).

GPR measurements were made in the Deterrent Burning Ground in those portions of the site where historical records and aerial photographs revealed pit locations where burning activities took place. GPR traverses were made at 10-foot intervals in these locations. Figure C-11 shows the locations of the traverses made in three separate areas within the Deterrent Burning Ground.

Two ground conductivity anomalies are evident on Figure C-9 in the northwest and northeast portions of the site (these are also shown on the summary map, Figure C-11). The negative anomalies on Figure C-10 (labeled TC-N) are probably caused by metallic debris either at the surface or buried close to the surface.

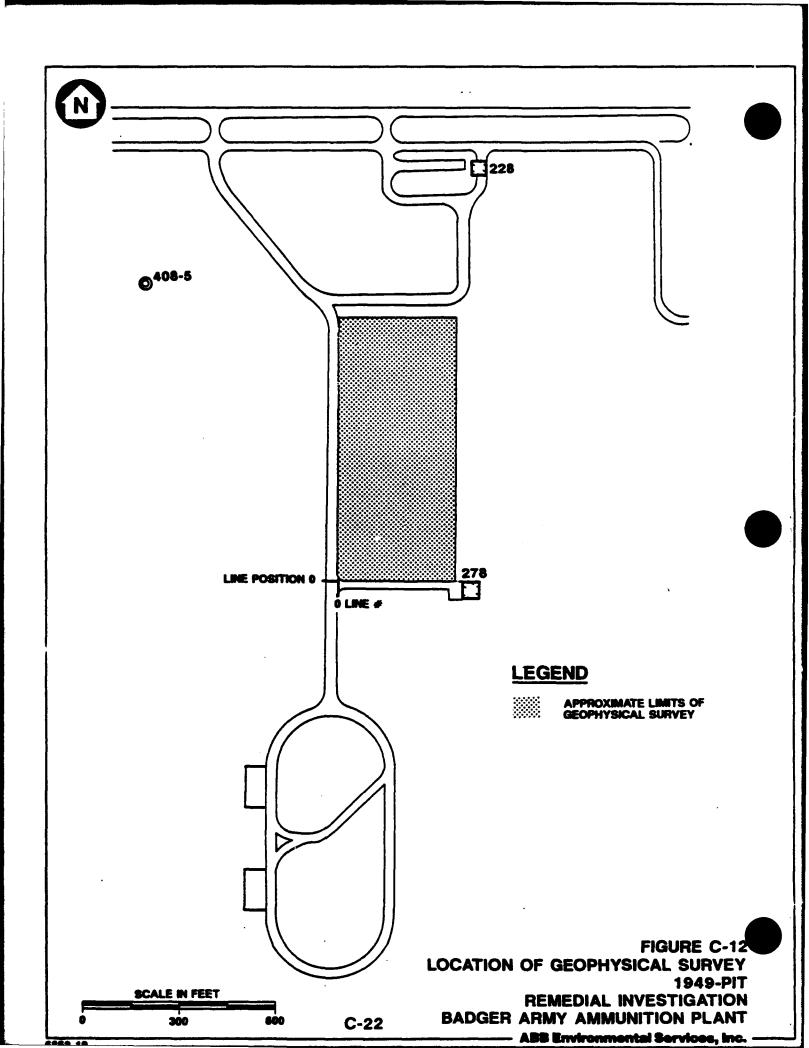
The most prominent anomaly on the summary map, Figure C-11, is a broad TC "high" in the northwest portion of the study area. This feature is labeled TC-H1. Site records indicate that the high ground west of TC-H1 was excavated and subsequently backfilled with refuse. It is probable that TC-H1 is an anomaly created by the generation of electrically conductive leachate in groundwater. A second, less pronounced TC high is located in the northeastern portion of the study area (labeled TC-H2). This anomaly is possibly related to the old deterrent burning pit, but it is diffuse and thus not useful for locating test pits or borings.

GPR traverses were made in the northwestern corner and along the eastern flank of the Deterrent Burning Ground (Figure C-11). Four anomalous zones were mapped (GPR-1, GPR-2, GPR-3, and GPR-4). Anomalies GPR-1 and GPR-2 are similar in that they are characterized by a distinct lack of reflections from subsurface strata. The reason for this is not known, but could be related to past site activities. Anomalies GPR-3 and GPR-4 are also similar to one another: they are characterized by shallow, moderate to strong reflections common in landfills. Refuse typically retains moisture which generates electrically conductive leachate, producing a large contrast in the electrical properties of subsurface materials.

C.2.3 1949 Pit

A geophysical survey consisting of both magnetometer and GPR surveys was conducted at the 1949 Pit at the Propellant Burning Ground. Prior to any magnetic measurements or GPR profiling, a 260-by-600 foot survey area with a 20 foot grid spacing was established using pin-flags, a compass, and a 100 foot tape. The survey grid was tied to the asphalt road bordering the eastern edge of the study area (Figure C-12). Grid points along the edge of

W0039213CAPP 6853-12



the road (Line 000) were marked accordingly at 50 foot intervals with orange spray paint. Twenty foot intervals were marked on the road bordering the northern portion of the study area.

The geophysical investigation consisted of two surveys. Magnetometer and GPR surveys were used in conjunction with one another to help confirm the presence and location of buried metallic objects and the presence of former excavations. Magnetometer data aids in the detection of buried ferrous materials while GPR data helps to define the edges of excavations and can also detect the presence of metallic objects. Analysis of historical records and aerial photographs of the site from 1947 up to the present strongly suggested that the 1949 Pit Area of the Propellant Burning Ground may be an area where significant amounts of buried ferrous materials exist. A brief description of each survey follows.

For the magnetometer survey, an EDA Instruments Omni Plus Vertical Gradiometer was utilized for data acquisition. A total of 434 magnetic station measurements were taken within the pre-established 260 by 600 foot grid. Additionally, a magnetic base station was established to monitor diurnal variations in the earth's magnetic field. Base station readings (Table C-3) were taken approximately once per hour during the course of the magnetometer survey. Base station values fall within the range of expected diurnal variation.

All magnetic data were recorded in the instrument's internal data logger and down-loaded to a personal computer at the conclusion of each field day. These data were compiled and contoured using various computer applications software. Data evaluation was conducted in the field both during the survey and after initial computer processing.

Results from the magnetometer survey are presented in the form of vertical gradient contours (Figure C-13). Superimposed are surficial metallic objects encountered during the survey. Surface metallic debris consisted primarily of crushed powder drums, fence cable, and electrical cable. Based on the magnetic signature characterizing the site in Figure C-13, the site was divided into two areas. Area 1 contains significant amounts of buried ferrous materials. Area 2, on the other hand, is unlikely to contain any large quantities of buried ferrous materials. A discussion of both areas follows.

Area 1. Figure C-13 illustrates the magnetic signature of the 1949 Pit. The area showing the greatest concentration of magnetic anomalies was designated as Area 1. The magnetic signature of Area 1 is indicative of significant amounts of ferrous materials buried throughout this portion of the study area. These magnetic anomalies are found within a 500

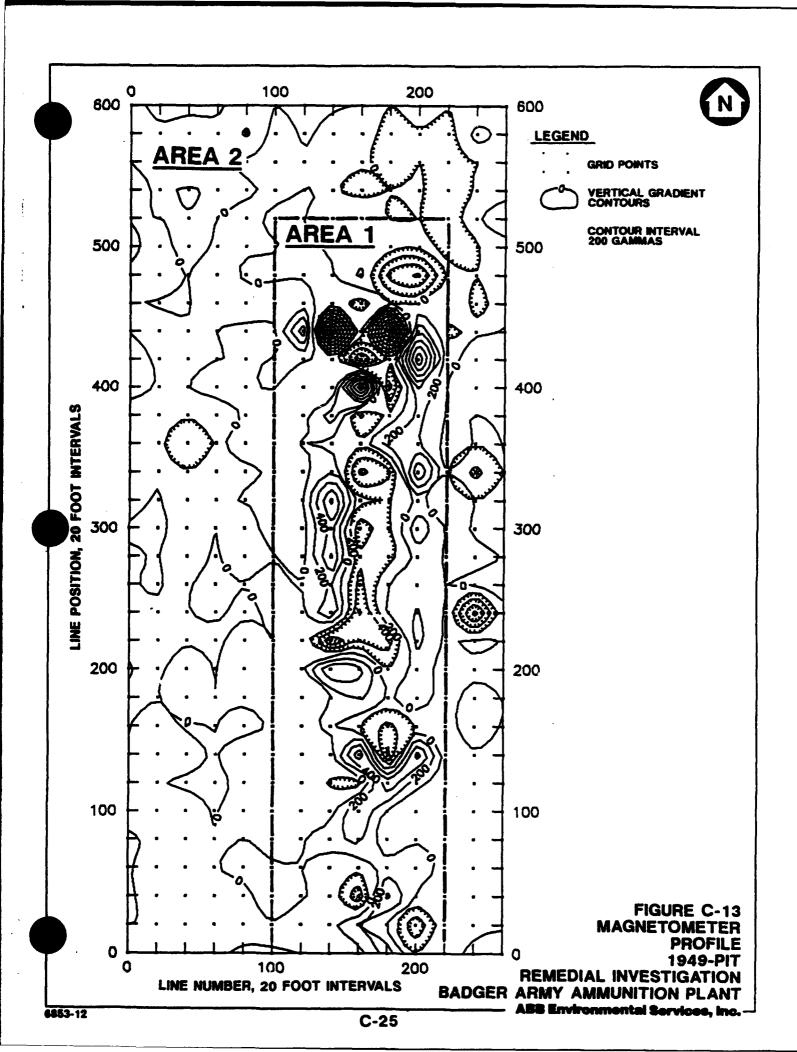
TABLE C-3 BASE STATION VALUES MAGNETOMETER SURVEY AUGUST 21-22, 1990

REMEDIAL INVESTIGATION BADGER ARMY AMMUNITION PLANT

DATE	TIME	TFV ¹
08/21	17:54	57318.5
08/21	18:19	57289.6
08/22	07:47	57152.8
08/22	08:47	57168.9
08/22	09:17	57166.5
08/22	10:42	57165.6
08/22	11:34	57159.5

Motos:

Total (magnetic) field value, in gammas.



foot long by 80 to 100 foot wide corridor trending roughly north-south through the study area.

Anomalies displaying the highest relative amplitudes are located in the northern portion of Area 1. These anomalies encompass a roughly 80 by 120 foot area centered about the Line 160, Position 420. Anomalies in this portion of Area 1 are coincident with the location of what appears to be an asymmetrically-shaped burning ground pit (characterized by a dark area haloed by a light photo-toned area) in 1949 aerial photographs of the site. Anomalies at this location also correspond to the location of a prominent radar anomaly (RA-1) found approximately 2 to 3 feet below ground surface (bgs).

Other magnetic anomalies detected throughout Area 1 correspond to ground scar and the location of past landfilling activities observed in aerial photographs. The relative amplitudes of magnetic anomalies found throughout the central and southern portions of Area 1 are also indicative of significant amounts of buried ferrous materials.

The remainder of the site (Area 2) appears to have no significant magnetic anomalies. Even though portions of the area were found to have a steel cable fence, crushed powder drums, and steel/aluminum electrical cable on the surface, these metals did not appear to have an adverse effect on the resolution of buried metallic objects. Therefore, based on these data and field observations, magnetic anomalies detected in this area are interpreted to be a result of surficial metallic objects.

For the GPR survey a GSSI SIR System III GPR unit with a 500 MHz antenna was used for profiling within the pre-established 260 by 600 foot grid. Based on magnetometer survey results, GPR profiles were made perpendicular to the long axis of the area defined by the magnetometer survey (Figure C-13). A total of 26 GPR traverses were made in a roughly 120 by 500 foot area. Analog strip chart recordings were analyzed and interpreted in the field.

Based on the results of the magnetometer survey, Area 1 was chosen for further study using GPR. A total of seven radar anomalies or anomalous areas (labeled as RA-#) were identified and are outlined in Figure C-14. Table C-4 provides a listing of each identified anomaly; its observed characteristics and relationship to magnetic anomalies. RA-1 is the strongest reflector (2 to 3 feet bgs) encountered during the GPR survey and corresponds directly to the area where the largest magnetic anomalies are observed. The signature of this anomaly is consistent with a significant amount of buried ferrous materials and may be indicative of a large tank or buried drums and/or other metallic objects. Other shallow anomalies displaying strong reflective characteristics include RA-3, 4, 6, and 7. The

W0039213CAPP 6853-12

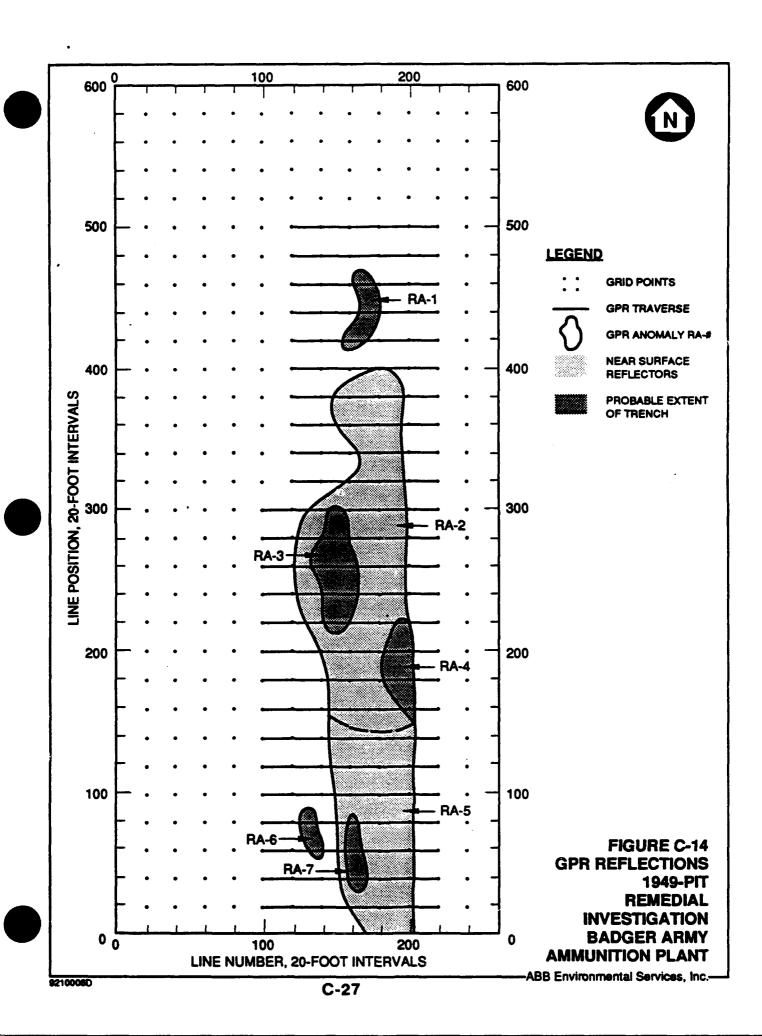


TABLE C-4 GROUND-PENETRATING RADAR ANOMALY CHARACTERISTICS

REMEDIAL INVESTIGATION BADGER ARMY AMMUNITION PLANT

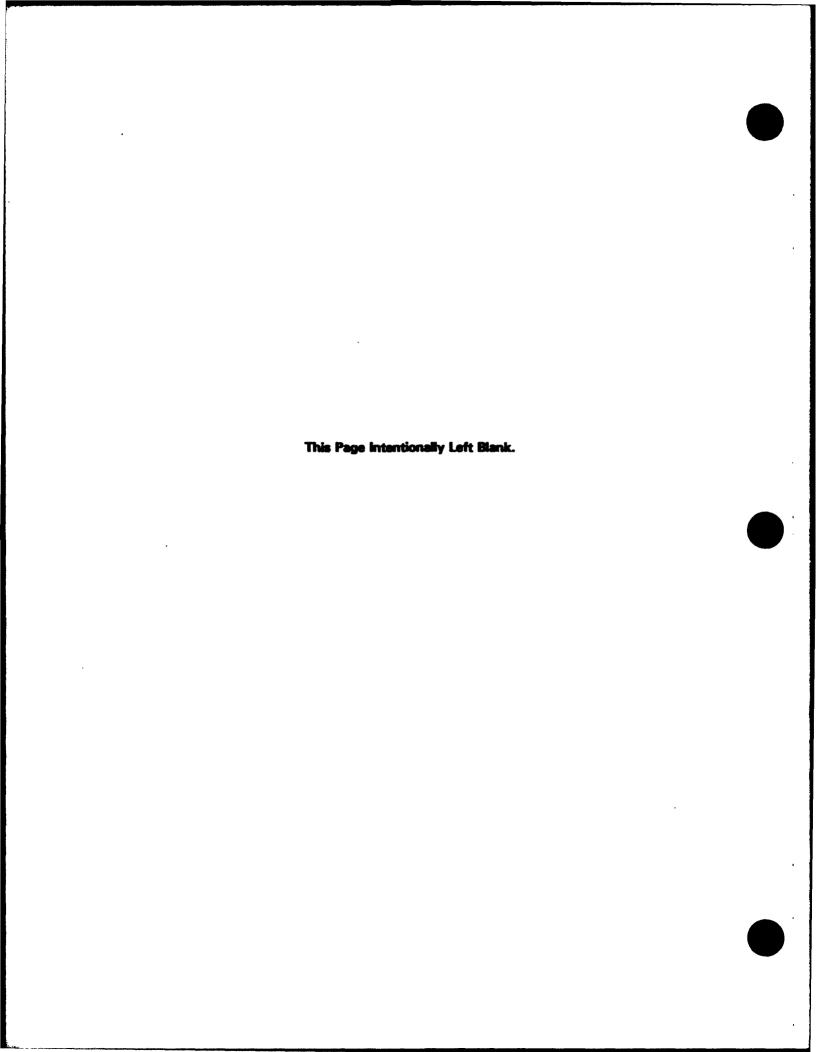
RADAR ANOMALY	CORRESPONDENCE TO MAGNETIC ANOMALY	Characteristics of Anomalies/Anomalous Areas	INTERPRETATION
RA-1	Yes	Strong, narrow (≤ 10 ft.), continuous reflector, 2-3 feet bgs	Possible buried drum area and/or high concentration of various metallic objects
RA-2	Yes	Relatively weak, broad (20-80 ft.) discontinuous reflectors, extending 3-5 feet bgs	Trench/pit area with moderate concentrations of various metallic objects
RA-3	Yes	Strong, relatively broad (≤30 ft.) continuous reflector, extending 1-3 feet bgs	Trench/pit area containing high concentrations of various metallic objects
RA-4	Yes	Strong, fairly narrow (≤20 ft.) continuous reflectors, 1-2 feet bgs	Trench/pit area containing high concentrations of various metallic objects
RA-5	Yes	Moderately strong, broad (60 ft.) discontinuous reflectors, extending 3-5 feet bgs	Trench/pit area containing high concentrations of various metallic objects
RA-6	NO	Strong, narrow (≤10 ft.) continuous reflector, 1-2 feet bgs	May correspond to area of concrete at surface
RA-7	Yes	Strong, narrow (≤10) continuous reflector, 1-2 feet bgs	Corresponds to area of concrete with wire mesh at surface

signature of these anomalies is indicative of buried concrete with wire mesh or rebar. This observation is consistent with the surficial presence of these materials in the vicinity of RA-7.

The remaining anomalous areas, RA-2 and RA-5 (3 to 5+ feet deep), coincide with the location of former possible landfilling activities. However, it should be noted that the radar signature between these anomalies is slightly different. RA-2 is characterized by weak, discontinuous reflectors whereas, RA-5 is characterized by moderately strong, discontinuous reflectors. This may reflect a change in the types of waste contained in each area, suggesting there may be a grater concentration of metals at RA-5. However, the difference between FA-2 and FA-5 may be a function of geologic conditions such as soils having a greater silt content. According to these data, the 1949 Pit area is approximately 400 feet long and 20 to 80 feet wide.

<u>Conclusions and Recommendations</u>. As a result of the magnetometer and GPR surveys, the following general conclusions can be made:

- Magnetic anomalies in Area 1 are interpreted to be the result of substantial amounts of buried metallic objects found within a 500 foot long by 80 to 100 foot wide corridor trending north-south through the study area. Area 1 radar anomalies suggest waste may extend deeper than three feet bgs.
- Wastes buried in Area 1 may include concrete with rebar, buried drums and building demolition debris.
- Area 2 shows no significant magnetic anomalies suggesting that no considerable amounts of buried metallic materials or debris exist in this area.



APPENDIX D

DRILLING AND SOIL SAMPLING PROGRAM

- D.1 Test Pit, Soil Boring, and Monitoring Wells Boring Logs
- D.2 Field Data Records Soil, Sediments, and Surface Water
- **D.3** Monitoring Well Construction Diagrams
- D.4 Well Development Records
- D.5 Regional Water Supply Well Logs

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Appendix D.1

Test Pit, Soil Boring, and Monitoring Wells Boring Logs

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TEST PIT LOGS

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PBT-90-03		ABB-ES	9/5/90
PBT-90-04		ABB-ES	9/5/90
PBT-90-05		ABB-ES	9/5/90
PBT-90-06		ABB-ES	9/6/90
PBT-90-07		ABB-ES	9/6/90
PBT-90-08		ABB-ES	9/6/90

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	3. T. Buss
2060 Topseil	4.
POGO PIRE	5.
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	Exposure
	photos 28+29

90000067

BAAP TEST PIT RECORD 2 of 2 Profile Along Test Pit- PRT-90-06 SITE Propellant Burning Ground "1949 pit" SKETCH MAP OF TEST PIT PROFILE 0.0-60 TOPEOSA 4.0 wind messy water shows material moist. 65-7.5' Rusty or Form m 3.0 7.5-9.5 Dark brawn to black silly 5. 9.5-10 Tan, 5. to m. 5 Doee 10b SCALE 1" = SAMPLES OBTAINED: DEPTH (FT.) Depth (Ft.) Int. Ser. HD. SP. VOA No. PPM No. NOTES: _ 17006003 BEG 5 30 Dample I taken at 3 ft. May reflect **S-2** 9.0 7900009 **S-3** S-4 S-5 Dample 2 taken at 9H. 260 to S-6 reflect general waste native soil S-7 **S-8** PICTURES ELT 27, 28(?) REFERENCE: Field Book, Pg. _ Attachments _____ SIGNATURE: ___

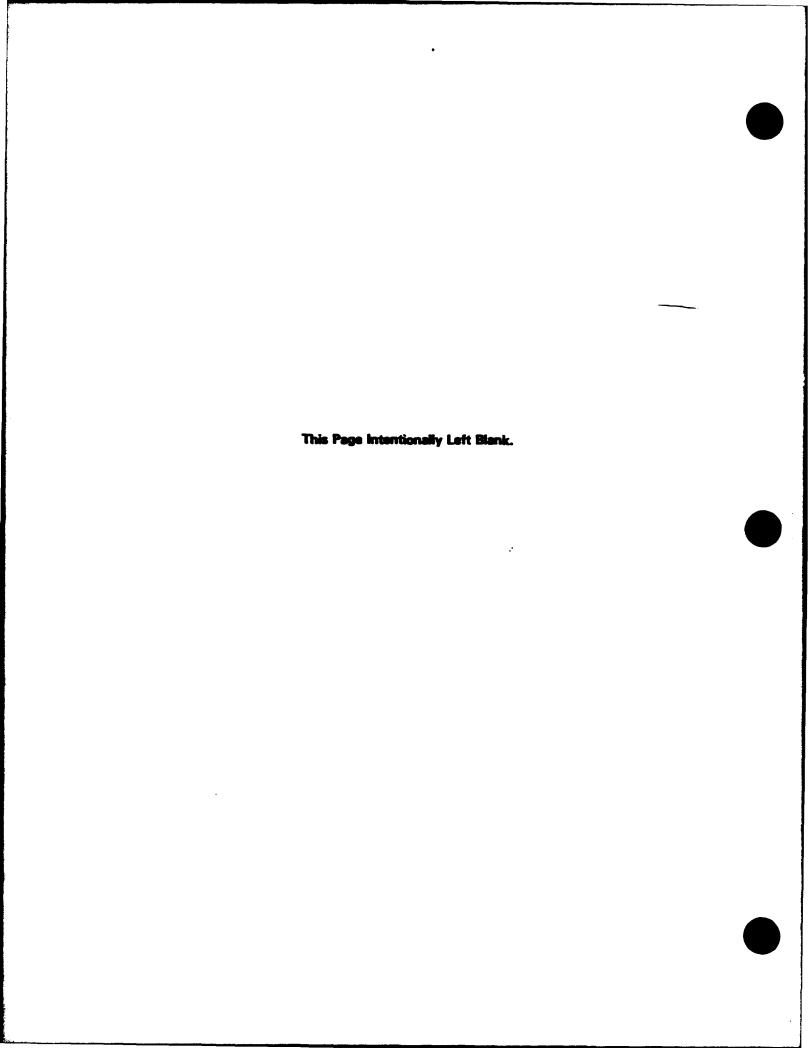
BAAP TEST PIT RECORD	
SITE Propolant Burning Ground	1 of
TEST PIT DE PRI-90-07 DATE 9/6/50 TIME /C COORDINATES GRID ELEMENT	END _//5
SKETCH MAP OF TEST PIT SITE	
45'	1. O. Orlay 2. T. B.S.
P445 8	3.5, Calkin
3-40-6	5. 6.
WIND	MONITOR EQUIPMENT: PI Meter Y N Explosive Gas Y N
NOTES:	Avail Oxygen N N OVA Y N Other
TAZOM (8 × 45 × 3-4)	Photographs, Roll
	Exposure
	Plustos 30-34
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	E.C.JORDAN CO.

SITE Property Burning Go	\sim			
SITE DIFFERENCE OF	2024			
SKETCH MAP OF TEST PIT PROFILE				
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0.4			30->	100
Black holon / Sh & "	\;\ <u>\</u>	1	5. %	S
152			5	eser.
SCALE 1" =FT.				
DEPTH (FT.)	SAM	PLES OBTAI	NED:	
NOTES:	No.	Depth (F	t.) int Ser. No.	HD. S
	S-1		79007003	
5-1 12 a Devoto Sando X	S-2	4.0	1900,000	18/
a black charcoul (ash)	S-3			
	S-4 S-5			
5-2 13 a ascrete surple	S-6		<u> </u>	
tan, 5. to m. rand, 1	S-7			
	S-8			
	l			
				Ø.
	REF	ERENCE: F	ield Book, F	9
	REF		ield Book, F :tachments	

BAAP TEST PIT RECORD

BAAP TEST PIT RECORD	
SITE Propellant Burning Shore	1 of
TEST PIT PRT-90-08 DATE 9/2/90 TIME	END
COORDINATES GRID ELEMENT	
SKETCH MAP OF TEST PIT SITE	
P440 L140 L120 L190	CREW MEMBERS:
	1. 5. Calker
	2. T. BUSS
P420	3. D. Dorlong
9	4.
9400 18'	5.
7.5 Deepo	6.
	MONITOR EQUIPMENT:
WIND	PI Meter N
SCALE 1" = ? FT.	Explosive Gas Y N Avail Oxygen Y N
NOTES: TP-8 beet according to	OVA Y N
	Other
and some some some	Photographa Pall
	Photographs, Roll
	Exposure
	Photos
	
	E.C.JORDAN CO.

			HAAP	rest pit	RECO	RD		
		Profile Ale	ng Tage Die	त्यो	DRY.	- 90 - 08	.	2 of 2
	.5		ng Test Pit-		7 1	10 0		
	SITE _ Trop	ellant t	Erning	SMAN	<u>a</u>			
	SKETCH MAP	OF TEST PIT	PROFILE					
0.0		N .				7 10	0-200	74.8-07.
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	Booldbar					ملوا	1.5-2.5 DIA	RZBAR
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₹.0	SCALE 1" = _	<u> </u>		7.5	!			
	DEPTH (FT.)	 *	••		SAMPL	ES OBTAIN		
	NOTES:				No.	Depth (Ft.	Int. Ser.	HD. SP. VOA PPM
					S-1	3.0	7705002	BEG
*			mode con	asstry	S-2 S-3	F.O	79008003	BRG
	A ton	21/2 2 A	mand		5-4	7.0	7908007	BRO
*	5-2 6-	بالمحدود	o samplo	eon stive	S-5			
•	A des		to black:	50(49	S-6			
	Janel.				S-7 S-8			
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7	& matt	/ A) -	t/ormo	cement				
	5. to so		/ 3		REFER	ENCE: Fiel	ld Book, Pg	•
						Atta	chments_	
			-		0.00			
					SIGNA	IURE:	····	
	90000067						E.C.JO	RDAN CO



SEDIMENT LOGS

Boring Description	Contractor	Date Installed
Control Pond		
CP-1	Ayres	6/29/84
CP-2	Ayres	6/28/84
CP-3	Ayres	6/30/84
Ballistics Creek		
BC-1	Ayres	7/3/84
BC-2	Ayres	7/3/84
BC-3	Ayres	7/3/84
BC-4	Ayres	7/3/84
BC-5	Ayres	6/30/84
Ballistics Pond		
BP-1	Ayres	7/1/84
BP-2	Ayres	7/3/84
BP-3	Ayres	7/3/84
BP-4	Ayres	6/30/84
BP-5	Ayres	7/1/84
BP-6	Ayres	6/29/84
BP-7	Ayres	6/30/84
Control Pond		•
Spike 1	Ayres	7/3/84
Spike 2	Ayres	7/3/84
Spike 3	Ayres	7/3/84
Spike 4	Ayres	7/3/84
Spike 5	Ayres	7/3/84
Spike 6	Ayres	7/3/84
Spike 7	Ayres	7/3/84
Spike 8	Ayres	7/3/84
Final Creek		
FC-1	Ayres	6/29/84
FC-2	Ayres	7/1/84
FC-3	Аутеѕ	6/29/84
FC-4	Ayres	7/1/84

		< 120 IQA
FC-5	Ayres	6/29/84
FC-6	Аутеѕ	6/30/84
FC-7	Ayres	6/29/84
FC-8	Ayres	7/1/84
Final Pond 1		
FPI-1	Ayres	7/1/84
FPI-2	Ayres	7/2/84
FPI-3	Ayres	7/1/84
FPI-4	Ayres	7/3/84
FPI-5	Ayres	7/2/84
FPI-6	Ayres	7/1/84
FPI-7	Ayres	7/1/84
FPI-8	Ayres	7/1/84
FPI-9	Ayres	7/1/84
FPI-10	Ayres	7/2/84
FPI-11	Ayres	6 /29/84
FPI-12	Ayres	6/29/84
FPI-13	Ayres	6 /29/84
FPI-14	Ayres	7/1/84
Final Pond 2		
FPII-1	Ayres	6/30/84
FPII-2	Ayres	7/2/84
FPII-3	Ayres	7/2/84
Final Pond 3		
FPIII-1	Ayres	6/28/84
FPIII-2	Ayres	6/28/84
FPIII-3	Ayres	6/30/84
FPIII-4	Ayres	6/29/84
FPIII-5	Ayres	6/28/84
FPIII-6	Ayres	6/28/84
FPIII-7	Ayres	6/29/84
FPIII-8	Ayres	6/28/84
FPIII-9	Ayres	6/29/84
FPIII-10	Ayres	6/29/84
FPIII-11	Ayres	6/30/84
FPIII-12	Ayres	6/30/84
FPIII-13	Ayres	6/28/84
FPIII-14	Ayres	6/28/84
FPIII-15	Ayres	6/28/84

Final Pond 4

FPIV-1	Ayres	6/29/84
FPIV-2	Ayres	6/30/84
FPIV-3	Ayres	7/1/84
FPIV-4	Ayres	7/1/84
FPIV-5	Ayres	7/1/84
FPIV-6	Ayres	6/30/84
FPIV-7	Ayres	7/1/84
FPIV-8	Ayres	6/30/84
FPIV-9	Ayres	7/1/84
FPIV-10	Ayres	6/28/84
	•	
Nitroglycerine Pond		
NC 1	A	7/1/04
NG-1	Ayres	7/1/84
NG-2	Ayres	6/30/84
NG-3	Ayres	6/30/84
NG-4	Ayres	6/30/84
NG-5	Ayres	6/28/85
NG-6	Ayres	6/30/84
NG-7	Ayres	6/30/84
NG-8	Ayres	6/30/84
Oleum Pond		
OP-1	Ayres	6/27/84
OP-2	Ayres	6/27/84
OP-3	Ayres	7/2/84
OP-4	Ayres	7/1/84
OP-5	Ayres	7/1/84
OP-6	Аутеѕ	6/26/84
OP-7	Ayres	6/28/84
OP-8	Ayres	7/2/84
OP-9	Ayres	6/27/84
Rocket Area		
RAD-1	Ayres	7/2/84
RAD-2	Ayres	7/3/84
RAD-3	Ayres	7/2/84
RAD-4	Ayres	7/2/84
RAD-5	Ayres	7/2/84
RAD-6	Ayres	7/2/84
RAD-7	Ayres	7/3/84
RAD-8	•	
KAU-0	Ayres	7/3/84

RAD-9	Ayres	7/2/84
RAD-10	Ayres	7/2/84
RAD-11	Ayres	7/2/84
RAD-12	Ayres	7/2/84
RAD-13	Ayres	7/2/84
RAD-14	Ayres	7/2/84
RAD-15	Ayres	7/2/84
RAD-16	Ayres	7/2/84
RAD-17	Ayres	7/2/84
RAD-18	Ayres	6/30/84
RAD-19	Ayres	7/1/84
RAD-20	Ayres	6/30/84
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SAMPLE LOG

SAMPLE LOG							
PROJECT NAME	Olin Eco/Env	DATE: 6/29/84 PROJECT NO.: 3408. **					
SAMPLE LOCATI	SAMPLE LOCATION: Central Pand LOGGED BY: WEG SAMPLE						
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION					
:0 - 12 "		Photo IA25					
, ,	Fine sand. A few silty lamina in bottom 2" of zone. 54R: fine roots thru zone.						
12"- 31"	S P :	med to light brown fine sand. w/ brn, mottles throughout. Bottom 2" har chunk of blk. fine-sonly s: It.					
		10 4 R 6/6 Perm Somple 0-6"					
		Term of pro 0 0					
		TEST RESULTS					
	ERG LIMITS UNIT WEN	TYPE UNCONFINED PRINCIPAL PRINCIPAL PRINCIPAL					
	HTS HOEX WET DAY	OUPNESSION COMPRESSION COMPRESSION AMOLE STRESS					
Pl _a	n-						

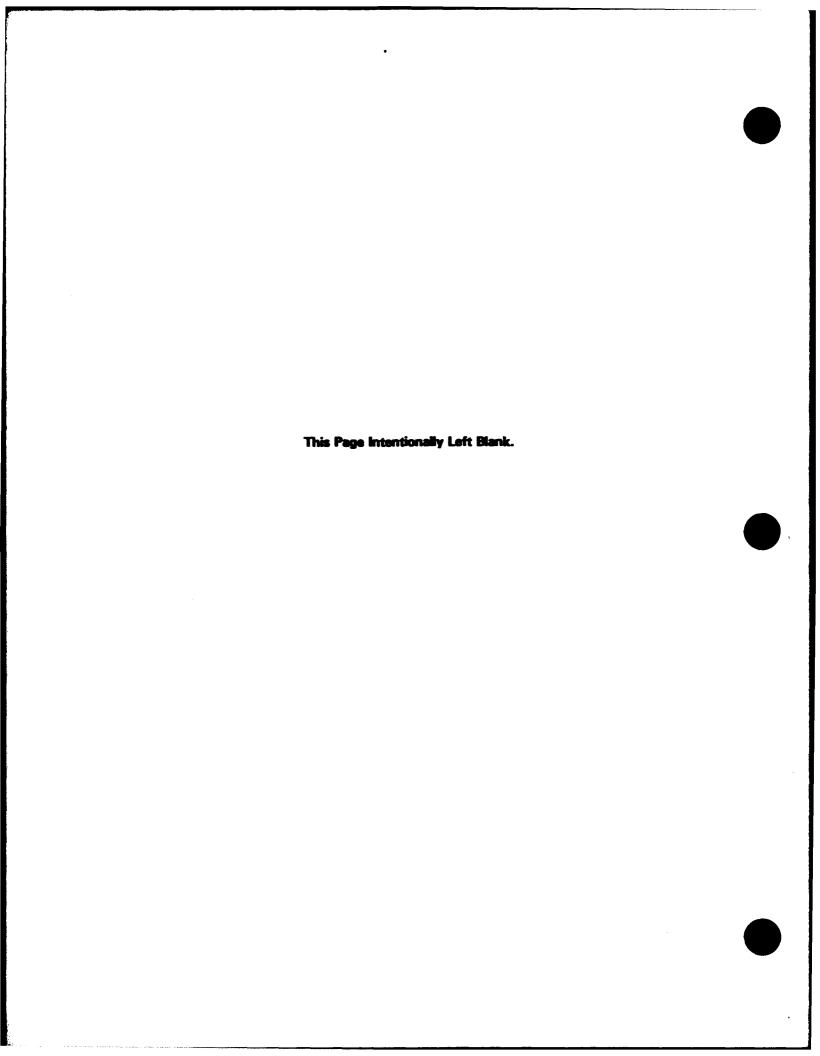
ASSOCIATES

SAMPLE LOG

Book and the		Olin BAAP	AYRES ASSOCIATES SAMPLE LOG	PROJECT NO.: 3408.00
	PROJECT NAME:	non: Control Pond - Wi		SAMPLE NO.: CP-2
	DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION	
Single Section 1	0 - 4" 4 - 15" END	OL SP	Photo IA 6 Gry-brn pond bottom Silt. 5Y 2.5/2. Gry fine - med sa on bottom 5Y 5/2 Perm 7-12"	Organic odor.
			no remaining sample for chemical analysis.	•
	l .	:	TEST RESULTS	
		ASSE LIMITS LIMIT WEN	TWEET ST	IGTH PARAMETERS

SAMPLE	MPLE ATTERBERS LIMITS		LE ATTERBERG LIMITS UNIT WEIGHTS							STREM	GTH PARAMETERS		
DEPTH		PLASTIC LIMITS	PLASTICITY INDEX	WET	DAY	BOVINIT	TEROS	9000	TYPE	UNCONFINED COMPRESSION	COMESION	PRICTION	STRESS
4-15"		Non j											·

Ų			•			S	AMPI	EL	-OG	ì	600.1	ect No.: 34	08.00	
	PROJECT NAM	Æ' _	<u>Ol:~</u>	Eco/E		ATE:	_6/3 *:	WE	G		SAME	LE NO.:	0-3	=
L	SAMPLE LOCA	ATIO	معناء:١	TEBLICA	CATION				DESC	NPTION				
I	DEPTH	4	SAMPLE	CLASSIFI	CATION	-	- 1		_	0				
I		- 1				1	Phot	ა :	I G	3				
	0-9"		(OL		Se	ture sys			v. b.	rn Orá	janic M	uck	
	9"~14′	4		SP		f.	فس	dar	k	torn whle	. frue s. Wet	e Sand - but 1	u/. nuts	A.
•							5	44/2	L					
[i4" – 23	⊢ "		ÇH		D! 50	k, oli	ive 54	clo 2.5	1/2	mod. to	, highly p	last;	
!	END													
1.														
يذها							PE	RM	@ 1	5-8	21"			
-									SULT					
١	·											GTH PARAME	TERS FRETION	DIFFERING
•		100	ARTIC	PLASTICITY	UNIT	WEIGHT	BOURNIT	CONTENT	DESMEE OF SATURAL	TYPE	COMPRESSION	CONCRION	MOLE	STREES
ſ	DEPTH LIN	T S	LIBRITS	MOEX				-5						



SAMPLE LOG

PROJECT NAME: 101: Eco/ENV DATE: 7/3/84 SAMPLE NO.: BC-1 SAMPLE LOCATION: Balltaties Creek LOGGED BY:____ DESCRIPTION SAMPLE CLASSIFICATION photo ID3 Brn soundy silt. Top 1" is mostly organic ML 0-16" leaf stems, dead grow, etc. held together w/ s: 1t. Front 1"-2" is very moist light buff colored silty clay, color 104R 6/4(moist) (Dry - white), From 2"-16" is predomment brn color - 5 YR4/4. A black sand patch at 13", send increased in bottom 2". Also. present is weathered gravel up to 12 dia. 3P Brn fa-med sand. 543/4 End Perm 18"-23" TEST RESULTS STRENGTH PARAMETERS COMPRESSION C-20 9-0' 231 12.1 11.0

ASSOCIATES

SAMPLE LOG

PROJECT NAME: DIE Eca/ENU DATE: 7/3/84 PROJECT NO: 3408,000

SAMPLE LOCATION: Ballistics Cred LOGGED BY: W.F.G. SAMPLE NO: BC-2

SAMPLE LOCAT	ON: Dall STREET COR.	LOGGED BY: UF C SAMPLE NO.: DC-X
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0-84	sm	photo IDI (IDO?) Brn Silty Sand, somewhat streky. Soudis mostly fine-med but some cs soud & fine gravel are present.
8"-22"	ML	Gry & bon clayery, soundy, s: It w/ tr gravel up to 2". Some gravel is weathered. Clay and silty sound occur
END	•	in non-homogeneous patches. Some black sound size meterial at 19-20" in an isolated patch. Clay zones are stiff, 7.5 YR 4/2 - clayey silt 7.5 YR 4/4 - soundy patch 5YR 3/2 - clay
	.	Perm 0-5"

34474	ATT	ERBEM	LIMITS	UNI	T WEIGH	TS	35	5.3		STREM	STH PARAME		
DEPTH	LIMITS LIGHTS	FLASTIC LIBITS	PLASTICITY	WET	967	BOUNNIT	808	262	TYPE	COMPRESSION	CONESIGN	AMOLE	STREETS
C-18 14-18" chyph	8 328	13,1	10.7							·			·
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PRO	ect N	ME : 🔿	lin Eco	/ENV	_ DAT	£:	7/3	184		<u></u>	PROJECT NO.	3408	00			
			Religh								BAMPLE NO.:		_			
	PTH		MPLE CLA			960 61			DESCRIP							
			INC. PE OF	BSIFICATIO												
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		İ			16	874	, a.	~ .)	·	om 8-1	o" is	Same	4			
					7	Zone. Fine Roots @ 20". A 1" soudy										
						Zone @ 19", 543/2										
_		- 1						•		1 3,50						
22"-	-25'	"	Sm		ي ا	> ^		•.		. 11						
_					7	>LN &	ld we	7 2	<u></u> d	e silt.	hq. ro	of @	25"			
					1 7	Broggy mod sand & silt. Lg. root @ 25" Predominant sand layer at 22". Remaider										
			•				بالم	aar s	. — a	layer .	7. 77	Rema	ida			
						is med sand & silt mixed. 5-4R 3/2										
5 - 4		,														
25".	-29	<u> </u>	cı	- .		Rust / Oli har affic along										
					1.	Rusty/olv. brn stiff clay Some v. thin layering, especially in bottom 2".										
					\	i. the	n la	syer	- ; - ; - ; -	especie	elly m	botton	~ 2"			
		1				5-464/6										
						·										
		}														
						TES	T RE	SULT	'S							
SAMPLE	677	T00504	LIMITS	LIMIT	WEIGH'		- 46			STREM	STH PARAME	TERS				
DEPTH	LINE		PLASTICITY	WET	DRY	BOUNNIT	CONTENT	BESIEE OF SATURAL	TYPE	UNCONFINED COMPRESSION	CONESIGN	PRICTION	EFFECTIVE STRESS			
C-19			·													
•	33.3	16.8	16.5													
										·						

SAMPLE LOG

PROJECT NAME: DIE Eco/ENU DATE: 7/3/84 PROJECT NO.: 3408.00

SAMPLE LOCATION: Ballistics Creek LOSSED BY: WEG SAMPLE NO.: 12C-4

DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0 - 12"	SP-SM	photo ID7 gry-brn, wet, silty med. sound w/ abundant leaves, twigs of wood pieces, Organics decreas w/ depth. 54R3/2
12"-18"	Sludge	Gry to blk, v. soft, saturated sludge like, material, Pudding texture & behavior. 7.5 4R 2/0
18" 19"	5 P	1" med-cs sand, w/some fine sand. 5 4R3/2
19*-24"	CH	Gry, soft clay w/ some silt. Severely weathered 1" gravel prece @ 25". 7.5 4R310
24"-27" <u>END</u>	sm	Gry, silty, sound w/ gravel. 7.5 4R4/0

SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	TS	55	5. 5	l	STREM	STH PARAME	TERS	
DEPTH		PLASTIC LIMITS	PLASTICITY WOEX	WET	987	BOUNNIT	STEGO	202	TYPE	COMPRESSION	COMESION	AMOLE	STREETINE STREET
MT-12 20-22													•
20-20	62.5	19.5	43.0							•			
												1	`
										!			

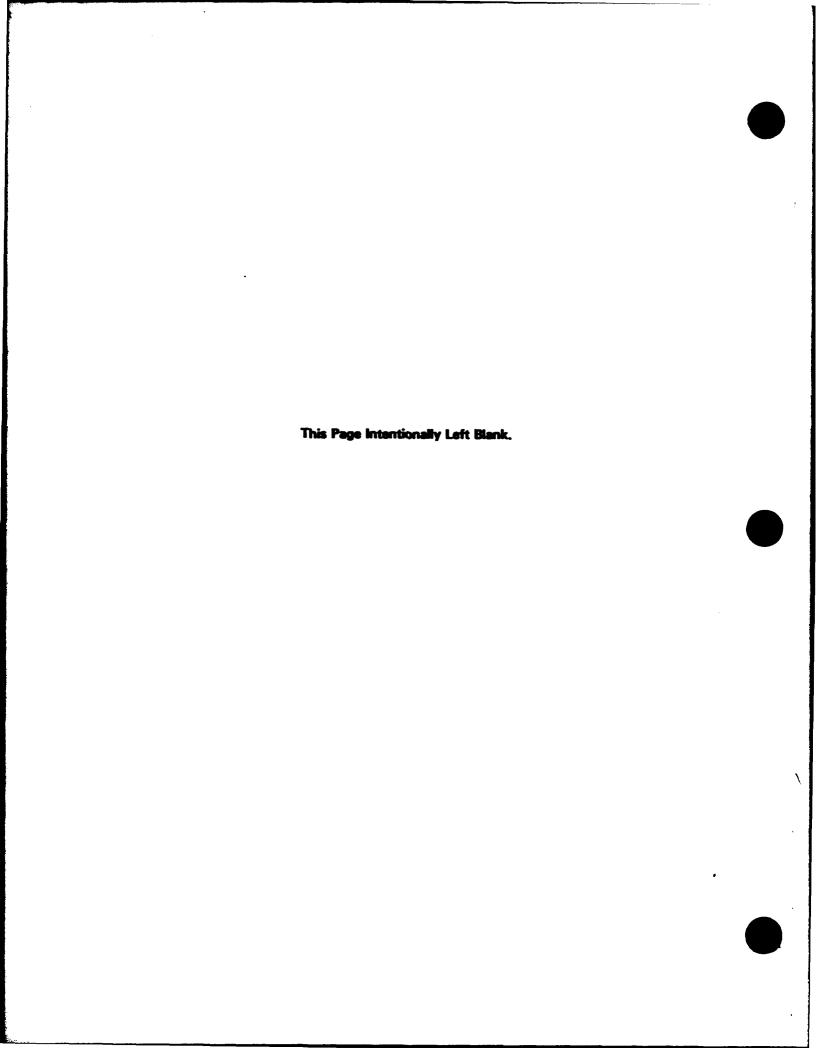
SAMPLE LOG

PROJECT NAME: OLL ECO/EAV DATE: 6/30/84 SAMPLE LOCATION: Ballieties Ck. LOSSED BY: U) FG SAMPLE NO.: BC-5 SAMPLE CLASSIFICATION Photo IA 30 Dk gray - brn silty clay w/ numerous 0-13" roots. Last 3" blk color increases. Soil feels moderately plantie. 542.5/A BIK. very plastic silty clay. Bottom CH ~1" saturated, Roots present but finer than above. Lumpy texture. 2,5 42/0 End

TEST RESULTS

:...

SMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	TS		¥.5		STREM	GTH PARAME	TERS	
DEPTH	LIMITS		PLASTICITY IMBEX	WET	DRY	BOUNNIT	TROS	P ST	TYPE	COMPRESSION	CONESION	PRICTION	STRESS
M-13				!									
	≂ 9 u	251	24.3										
-16	31.7	35.1											
													1



ASSOCIATES
SAMPLE LOG

SAMPLE LOCAT	UNI SURVINIONI DING	SAMPLE NO.:
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0-10	Sω	Photo IB 30 Brn Cs of fine Sound. 104184/4
10-26"	CL-ML	Gry Brn firm gravely, sondy, solty clay w/ tr. gravel. 104R3/2
<u>End</u>	:	
		Perm 5"-10"

SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	TS		A TA		STREM	STH PARAME		
DEPTH	Menta Monto	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOUWIT	DESCRIPTION OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF	202	TEST	UNCONFINED COMPRESSION	CONESION	PRICTION	STRESS
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MTA													
1 "			-							,			
9-13"	75.5	13.1	7.4						·				

SAMPLE LOG 7/3/84 PROJECT NAME: OF ECO / ENV DATE: SAMPLE NO.: BP-2 SAMPLE LOCATION: Dallistics Bond LOSSED BY: DESCRIPTION DEPTH photo ID 6 ML Dk. gry-brn silt wy some day. Roots Horough interval. 542.5/1 Olb-brn, very stiff silty clay.
. Abundant fine black spaces. 544/2 Looks like carbon? END TEST RESULTS STRENGTH PARAMETERS

		PLANCE	·		1 4000	••	22			<u> </u>			
DEPTH	LIQUID	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOUNNET	MOLETT. COSTT	200 B	TOPE	UNCONFINED COMPRESSION	CONESION	AMOLE	STRESS
									:				
C-23													
مورثي	505	21.1	29.4									·	
10-30		·											

			JUN E	•						·	PROJECT NO.		
SAN	PLE LO	CATION	BALLIST	ics F	SAD ra	GGED BY	4	NE	<u>G</u>		SAMPLE NO.:	BP	-3_
D	EPTH	5	AMPLE CL	assifica	TION				DESCRIP	TION			
						Tech not BP Ball	jed over + p - 4 isti	du y. erl wa	Cher Cher Porma	retained on as	samplenalysind from	e s wa Sampi n th icini	s le e ty
				, 		TES		SULT	s				
SAMPLE			G LIMITS	WEIGH	TS	BOISTURE CONTENT	DESNEE OF SATURAT.			TH PARAME	TERS		
DEPTH	CHALLE	LIMITS	PLASTICITY	WET	DAY	BOUNNIT	\$8	8 3	TEST	COMPRESSION	CONCRION	AMOLE	STRESS
		-											

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SAMPLE LOG

PROJECT NAME: Olin Eco/ENU DATE: 6/30/84 PROJECT NO.: 3408,00

SAMPLE LOCATION: Ballistics Produced BY: WFG SAMPLE NO.: BP-4

DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0-8"	cL ?	Photo IBO Olivebra very soft clay? near saturation. Feels like Jello.
8 - 19"±	Sludge	Tube head imprint in top of sample. 543/2 Blk "jello" sludge. Interval 2-19" sheared during extraction. 2.542/0
19"-33"	Sludge?	Blkfdire brn marbled clay/sludge. 54 2.5/2 - 2.542/0
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SAMPLE	ΑΠ	ERBERG	LIMITS	UN	T WEIGH	TS		P. P. P. P. P. P. P. P. P. P. P. P. P. P		STREM	STH PARAM		
DEPTH		PLASTIC LIMITS	PLASTICITY	WET	DRY	BOUWART	88	8 9 P	TYPE	UNCONFINED COMPRESSION	COMESION	ABOLE	STRESS
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m-35		}								-			
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ASSOCIATES AMPLE LOG

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PROJ	ECT N	ME: C	I'm Eco	ENK	DAT	re:	7/1	184	· · · · · · · · · · · · · · · · · · ·		PROJECT NO.	3900	, —
SAM	PLE LO	CATION:	Ballist	ze Po	طـده	GED BY	1	WFC			SAMPLE NO.:	BP.	<u>-5 </u>
DE	PTH	3/	MPLE CLA	SSIFICA	TION			1	DESCRIP	TION			
:0 -9	22"		Slud	ge-		Bla	.e.k 	ام نـــد	or i to	~ (2) ~ upp. o/u.b	er w/	BI K	
EN.	۵		;			te,	itu upp	۷۵. ۵۲	Sai part	r. Cho turate , Fir, mixed	d & v	i sof Now.	7
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		-				TES	T RE	SULT	'S				
MPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	TS	35	2 TE		STREN	STH PARAME	TERS	
DEPTH	LIQUID	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOURNIT	MOUSTUME CONTENT	DEBREE OF BATURAT.	TYPE	UNCONFINED COMPRESSION	CONESION	PRICTION AMOLE	STRESS

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SAMPLE LOG PROJECT NAME: Olin Eco/ENV DATE: 6/29/84 PROJECT NO.: 3408,00 SAMPLE NO .: BP - 6 WEG SAMPLE LOCATION: Ballistics Pand LOGGED BY: DESCRIPTION SAMPLE CLASSIFICATION Photo IA24 Streaked Uk,-gray sludge. Sludge 0-8"± color 7.5 YR 2/0 (moist) sample taken with a clam shell bottom sampler. Then transfered to shelly tube for transport.

SAMPLE			LIMITS	UNIT WEIGHTS			35	#_ 5		STREN	NGTH PARAMETERS			
DEPTH		PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOUNNIT	CONTEN	202	TYPE	UNCONFINED COMPRESSION	CONCOR	ANOLE	STRESS	
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PROJECT NAME: Din En / EN DATE: 6/30/84 PROJECT NO: 3408.00

SAMPLE LOCATION: Reflect Pond LOGGED BY: WFG SAMPLE NO: 139-7

DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0 E	Sludge	Photo IBI Sample collected w/ clamshell bottom sampler. Depth about 8". Sample transferred to Shelby Tube for transport. Gray - blk saturated sludge. Smell sulfur? Texture of chocolate pudding. 542.5/1

SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	73	55	2.3		STREN	TH PARAME	TERS	
DEPTH		PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOVYMIT	CONTEN	DEGREE OF BATURAL	TYPE	UNCONFINED COMPRESSION	CONEDICH	FRICTION ANOLE	ETHESS
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SAMPLE LOG

PROJECT NO.: 3408.00 PROJECT NAME: Olin Eco/ENV DATE: 7/3/84 SAMPLE LOCATION: Control Pond LOGGED BY: WFG SAMPLE NO.: Spike DEPTH SAMPLE CLASSIFICATION ID16 Dk. brn silty fine soud. SM Tr gravel. 543/2 Yellowish born uniform fine Soul. Some thin sity bonds, Bottom 2" darker bon & mothled. Tr fine gravel. 10 484/4 END TEST RESULTS

JAPLE	_ A: :	ELBERA		UTI UTI	1 MEIGH	13	26			O I NEW	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
		PLASTIC LIBITS	PLASTICITY INDEX	WET	DRY	BOUNANT	CONT	DESM OF SATUR	TEST	COMPRESSION	CONESION	PRICTION	STREET
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SAMPLE LOG

	. Olaw Eco/End	
SAMPLE LOCATI	1011: Control And	OBSED BY: WFG SAMPLE NO.: Spile 2
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
,0-11	SM	photo ID17 Dk. brn silty fine sound w/ Tr gravel, 543/2
n - 17"	SP	Yellow-brn uniform fine sound. Tr plant root or twigo 10 YR414
17-23"	5M	Brn. 5; Ity soud. 12" wood piece at 18". 2.574/2
<i>33</i> "-39"	SP	Yellow birn silty fine sound. Some olv brn silty zone that separate from the sound. 10 484/4
END	<u>.</u> .	
		TEST RESULTS
SAMPLE ATTERS	ierg limits unit wei	GHTS SE HE STRENGTH PARAMETERS

SAMPLI	ATT	ERBERG	LIMITS	UNI	T WEIGH	TS		E E		STREM	TH PARAME			•
DEPTH	LIGUID	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOUNNIT	900	PES PATON	TEST	COMPRESSION	CONESION	AMOLE	STRESS	
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			contr								PRÖJECT NO.: BAMPLE NO.:		
	PTH		AMPLE CL	نبير حند عدد		3020 611			DESCRIP		Desired No.		
0-	12/		. 51	n		Dk b	· · · · · · · · · · · · · · · · · · ·	- b	D 15	silt 4 1	543/2	•d.	
ね-	19"		SP			Brn. San	~4	• [1.91	h) fine ravel.	- unif Some	orm s: It	- ۲ سر
19".	- 30	w	Sm :)		yell w: "	مس دا ۾ ل	is h	d d	olu. bi	n si		
En	ط												
						TES	T RE	SULT	`S				
SAMPLE DEPTH			LIMITS		T WEIGH		CONTENT	DESMEE OF SATURAL	TYPE	STREM	TH PARAME	TERS FINETION	EFFECTIVE
	LIMITS	LIMITS	IMPEX	WET	DRY	BOUMANT	00 00 00 00	378	TEST	COMPRESSION	CONESION	AHOLE	STREAM

	Min Eco/Env	DATE: 7/3/84 PROJECT NO.: 3408.00
	on: Control Pond	
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
		photo IDB
0-8"	sm	DkBrn. fine sand & silt. w/ roots.
8" - 12"	SP	Yellowish brn uniform fine soud. 104R6/6
12" - 18"	SM	Brn. Silty fine sand. 544/2
18" - 26"	5 P	Yellowish bra uniform I'm soud.
END	-	One 1: grand prese at 19". 10/126/6
		TEST RESULTS
SAME E ATTERN	ERG LIMITS LIMIT WEN	CHTS SE STRENGTH PARAMETERS

SAMPLE	ATT	ERBERG	LIMITS	UNIT WEIGHTS			TEST	STRENGTH PARAMETERS						
DEPTH	LIGUIO	PLASTIC	PLASTICITY IMDEX	WET	DAY	BOUWHIT			TYPE	COMPRESSION	CONESIGN	PRICTION	STREET	
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SAMPLE LOG

PROJECT NAME: OLIVE ECO/ENU DATE: 7/3/84 PROJECT NO.: 3408.00 E LOCATION: Control Pond LOGGED BY: WFG

SAMPLE LOCATI	ON: Control Tone	LOGGED BY	SAMPLE NO.:SAMPLE NO.:
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION	
		.IDI2	
0-8"	mL	Dk brn silt & fir roots in top 2".	2,5-43/2
8-27"	SP	Yellow brn ; un	iform fine Sond.
٠		1" layer of mottle	od brn silt. 14R7/4
END	;	•	<u>-</u>
		_	

SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	TS	35	RE.		STREM	STH PARAME	TERS	
DEPTH	LIGUIO	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOUNNIT	TECON	90 90 90 90 90 90 90 90 90 90 90 90 90 9	TYPE	COMPRESSION	CONCESSOR	PRINCTION	STREES
			•										

PROJECT NAME	:Olin Eco/ENV	DATE:7	13/8			PROJECT NO	: 3401	r.00
SAMPLE LOCAT	101: Control Pond	LOGGED BY	<u> </u>	EG		SAMPLE NO.		
DEPTH	SAMPLE CLASSIFICATION			DESCRIP	TION			
0 - 6"	ML.	Dk bri			Top 3			
6" - 11 "	SM	Olv. go Bolton silt &	3 "	hord	4" la	yers of	•	
END		•	•					
	·	TEST F	FSUT	<u> </u>				
	ERG LIMITS UNIT WER		1 8 8		STREN	GTH PARAME	TERS	
LINES PLAN	THE PLASTICITY WET DRY	BOWNST S	See See See See See See See See See See	TYPE	COMPRESSION	CONESION	PROCTION AMOUS	STREETS
								-

PROJECT NAME: Olim Era/ENV DATE: 7/3/84 ___ PROJECT NO.: 3408.00 SAMPLE LOCATION: Control Pond LOGGED BY: SAMPLE NO .: SPIKE SAMPLE CLASSIFICATION Photo I 010 Dkgry-brn fine-med sand w/ SM . some silt. Abundant organic plant debris, 542,5/2 gry-brn fine sand. Abundant 42 fine roots. Tr cs sand. 543/2 TEST RESULTS STRENGTH PARAMETERS ATTERBERG LIMITS UNIT WEIGHTS DEPTH BOUNNIT WET

DEPTH		LOGGED BY: L) FG SAMPLE NO.: Spike 8						
	SAMPLE CLASSIFICATION	photo ID9						
6ry brn fmed sound w/ abundangrass, twigs, & other grante plant mai Tr. gravel. 543/1								
	,							
	1	•						
	DERG LIMITS UNIT WE	TEST RESULTS EIGHTS EIGHTS TYPE UNCONFINED CONCERN FINATION EPPERS TYPE UNCONFINED CONCERN AMOLE STREET						



SAMPLE LOG

PROJECT NAME: Olin ECO/ENV DATE: 6-29-84 PROJECT NO: 3408.00

SAMPLE LOCATION: Final Creek LOSSED BY: PS 4)

SAMPLE NO.: FC-1

DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0 -2"	SP	Photo IA-20 (2) Sand, fine grained, medium brown (7.59R5/4)
:		trace silt, "4" thick silty seem at 2°
2-5	SP	Sand, fine grained, light brown (1046/3) trace of silt, wood fibers
5-10"	ML?	Silt?, medium reddish-brown, saturated and musky (54R3/4)
10 - 14"	SM	Sand, coarse to fine, medium reddish- brown (7.5 YR 3/4), small gravel bottom
14"-27"	: SP	Sand, coarse to fine, medium yellow-brown, trace silt, scattered fibers
		Atterberg Pan M-1 Perm sample 20-27"

SAMPLE	ATTERBERG LIMITS			UNIT WEIGHTS				PAT.	STRENGTH PARAMETERS				
DEPTH	FIGURE .	PLASTIC LIMITS	PLASTICITY IMOEX	WET	DRY	BOUNNIT	EOST COST	PER PER	TYPE	UNCONFINED COMPRESSION	CONESION	PRICTION	STRESS
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SAMPLE LOG														
	_					DATE: 7-1-84 PROJECT NO.: 3408								
SAME	LE LO	CATION:	Final	Creek	La	OBGED BY: PSW SAMPLE NO.: FC-Z							2	
30	PTH	SA	MPLE CLA	SSIFICAT	ION	DESCRIPTION								
										IC6				
0-	41	, 	OL	-		Silt, dark brown (104R4/1) with straw, roots, fibers, snail shells, organic smell, saturated								
Ц [°] ,	- /0'		ُ ٥٧			Silt. black (7.5YR210) with strong organic smell, a little sub angular gravel at bottom, trace sand, saturated, firm								
10:"-	.V7 "		ML			Silt, medium gray-brown (10483/2), sandy, with a few scattered mottles, firm, saturated								
17*-	-23	*	GM			Gravel, medium gray-brown (10483/1), fine to coarse grained, subargular to subrounded, with some silt and sand, friable, saturated								
23:	25	,^	SF	1		Sand, dark brown (542.5/1), fine to coorse grained, with some silt and subrounded gravel, wet Atterberg pan 5-98								
					•	TES	TRE	SULT	'S					
SAMPLE	ATT	ERBERG	LMITS	UNI	T WEIGH	TS	35	¥. ¥		STREN	gth parame	TERS		
			PLASTICITY	DRY	BOUSHIT	MOUSTURE CONTENT	DEBNEE OF SATURAL	TYPE	COMPRESSION	CONESION	PROCTION	STRESS		
		·	·		•									

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			DinE	•			, ,				PROJECT NO.	340	8,00
SAMF	LE LO	CATION:	Final	reak	L00	GED BY:	<u> </u>	FG			SAMPLE NO.:	FC-	3
30	PTH	5/	AMPLE CL	SSIFICATI	ON				DESCRIP	TION			
0 -	0-9" SM						bed	n s ded in a	silt	w/ son 2-3" 7: owder Pa	s t c	lean	d, fine
9-1	6"		≲ ω :		T	ء للعد ندلامد	et tat	10	top ". 7	Is sander pour	ne. %	" Pow '6" co	der ntains
16 " -	29	, 4	SP - S	m?		Oline	bra Ca	, + ₃ 5 5	, 61.	eck si to In S	Ity fi	ne s	d.
End													
						TES	T RE	SULT	rs				
SAMPLE	ATT	ERBERG	LIMITS	UNIT	WEIGH	rs	25	DEBNEE OF BATURAT.		STREM	STH PARAME		
DEPTH	MINUS FIGURE	PLASTIC LIMITS	PLASTICITY INDEX	DRY	BOUNANT	MOUSTURE CONTENT	202	TYPE	COMPRESSION	COMESION	PRICTION	STRESS	
/n-17 2-23	n-17												

	: Yin Eco/Enu	DATE:	1/84		P	ROJECT NO.	: ZAOA	
SAMPLE LOCATI	1011: Final Creek	LOGGED BY	WEG		s	AMPLE NO.:	FC-	거
DEPTH	SAMPLE CLASSIFICATION		C	ESCRIPT	ION			
	·	Pho	oto:	IB;	29			
· 0- 9"	CL	Dk gry v.f.so-d	brn . Fi	sti-	ff silf	y clay 572.	jω/: 5/1	sone
9"-28"	- sm	DK br	10 P	+ o~	d soud	ω/ ₇	Tr gi	au.
FND	:							
		TEST F	RESULT		,			
SAMPLE ATTERS	BERG LIMITS UNIT WE	DONTS S	1 2 3		STRENG	TH PARAM	ETERS	
DEPTH LIQUID PLA		- learner E		TYPE	UNCONFINED	CONESION	PRICTION	SPREETINE

i Sample) ATT	ERBERG		UNI	T WEIGH	13	7 7 7	1 B 5	ł .	SIREM	SIN PARAME			1
DEPTH		PLASTIC LIBITS	PLASTICITY IMDEX	WET	DRY	SOUNNIT	MOUSTLU CONTE	PEST SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL SUPPL S	TYPE	COMPRESSION	COMESTON	PRICTION AMOLE	STREES	
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SAMPLE LOG

PROJECT NAME: Olin Eco/ENV DATE: 6/29/84 PROJECT NO.: 3408.00

SAMPLE LOCATION: Final Crede LOGGED BY: WFG SAMPLE NO.: FC-5

SAMPLE LUCAT	ON: KAD GEL	LOGGED BY: SMIPLE NO / C
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0 - 11" ±	SP-(ml) ?	Photo IA 19 (2) BIK. Silty sand w/ tr fn grav. 15" grav. @ 8". Pouder pellets
!/ " 22 "	SW-SP OF	present in top 2"-3". 542.5/2 Brn gravelly, (silty?) sand 543/2
2 -25	GP	Brn soundy gravel. Grav. is angular
END		to rounded, 3.54 3/2
	•	•
		*

SAMPLE	ATT	ERBERG	LMITS	UNI	T WEIGH	TS		1.5		STREM	STH PARAME		*.
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			9/in #								PROJECT NO.		
SAMP	LE LO		Final			GED BY:		NE	<u></u>		SAMPLE NO.	<u>FC -</u>	6
DEI	PTH	54	MPLE CLA	SSIFICAT	ION				DESCRIP	TION			
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2010		T0052	LIMITS	194	T WEIGHT					STRFL	ISTH PARAM	TERS	
SAMPLE DEPTH			PLASTICITY	WET	DOLA	BOUNNIT	MOUSTURE CONTENT	DEONEE OF SATURAL	TYPE	COMPRESSION	CONESION	PRICTION	STREETHE STREET
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PROJ	ECT NA	ME: T	Dlin E	co/Er	LY_ DAT	E:	6/3	9/54		1	PROJECT NO.	3408	, 50
SAM	PLE LO	CATION:	Fred	reele	L00	GED BY	h) FO			SAMPLE NO.:	FC.	<u>· 7</u>
DE	PTH	S	AMPLE CLA	SSIFICAT	TION				DESCRIP	TION			
Ref	- 10°		m	- CL	7 1	Phot Dark mod color	- ام	our	to icly	black . Tr o	claye grav	g 3:17	f of
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MAPLE		rper pa	LMITS	LIMIT	T WEIGHT			SULT	<u> </u>	STREM	TH PARAME	TERS.	
DEPTH		PLASTIC LIBITS		WET	DAY	BOUNNIT	MOISTURE CONTENT	DEBNEE OF BATURAT.	TYPE	UNCONFINED COMPRESSION	CONESIGN	PRICTION	EFFEDTINE STRESS
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SAMPLE LOG

PROJECT NAME: OLT ECO/ENV DATE: 7/1/84 PROJECT NO.: SAMPLE LOCATION: Final Creek LOGGED BY: LIFE SAMPLE NO.:	: 3408.00
SAMPLE LOCATION: TOTAL LOGSED BY! SAMPLE NO.:	FC-8
DEPTH SAMPLE CLASSIFICATION DESCRIPTION	
D-6" SP (SM)? Gry formed sound we p	
&"veins dk gry silt 2.5%	
6-8" SM Dkgry silty fine sand. 6"=12" SP-SM Godon 543/1	
12"-4" ML Gry & Olv. Silt and Sand up a.	
Tr gravel (westnered somisione 544/4	::/ t. -).
End . Perm 14"-20"	

SAMPLE				UNIT WEIGHTS			35	E E	STRENGTH PARAMETERS					
	LIGHTS	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	SOUNIT	11800 11808	9698 8078	TYPE	COMPRESSION	COMERION	AMOLE	STRESS	
MT-8			·										·	
10-13		N-P												
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PROJECT NAME	Olin Eco/ENY 0	MTE: 7/1/84	PROJECT NO.: 3408, 60
SAMPLE LOCATI		DOGED BY: WFG	SAMPLE NO.: FPI-1
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION	·
		Photo ICO	
0-29"	ML	Dk. brn clayey thick root zone throughout. Slightl 10 YR 3/1	silt. Top 3" Few f. roots y darker near bottom
End	•	• •	
		9000 900 U TO	

TEST RESULTS

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SAMPLE		ERBERG	LIMITS	UNIT WEIGHTS			35	#_\\\	STRENGTH PARAMETERS					
			PLASTICITY INDEX		DRY	BOUNNIT	MOSTLA CONTRE		TYPE	COMPRESSION	CONTRICK	AMOLE	STREES.	
		}												
175-7			·										1	
9-12"										٠			1	
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PROJECT NAME: Olin Eco/ENU DATE: 7/2/84 PROJECT NO.: 3408.00 BAMPLE LOCATION: Final Pond 1 LOSSED BY: WF & SAMPLE NO .: FPI-2 SAMPLE CLASSIFICATION DESCRIPTION - photo Ic11 Dk. brown, crumbly silt w/ some clay. ML A low top roots extend through interval. 2.593/2 Brn. Silt wy fine blk "specke" of ML unknown origin. Specks are cylindrical and tend to be sub-vertical. They are easily broken wil thumb neil q resemble carbon when broken open. Dra = 1/32-1/6" 10 YR 3/2

Perm. 24-30"

1															
1	ATTERBERG LIMITS		LIMITS	UNI	T WEIGH	TS	35	F. 2	STRENGTH PARAMETERS						
		PLASTIC LIBITS	PLASTICITY MOEX	WET	DRY	BOUNNIT	SOUTE SOUTE	202	TYPE	COMPRESSION	CONESION	PRICTION	STREAM		
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BOOLECT NAME	E. Olin Eco	/ENV ~						PROJECT NO.	3408	જ	
ľ	TION: Final F	,			•			SAMPLE NO.:			
DEPTH		SSIFICATION				DESCRIP					
			احر	ito	Ί	:C3					
0-4"	sm		Brn	. ۶	. الج س	ţ,	sand	10 YR	4/4		
4"- 13"	SP		Rust	ч Ь	۲n	<u>C</u> n	Sd.	7,5	YR 5/	' 6	
· 13-29*	SP		Brn f-m_ sand. Bottom 3" is moit (near sat.) and contains								
							7.5		ntai	4	
End											
			TES		SULT	'S					
SAMPLE ATTER	SERS LIMITS	UNIT WEIGH		CONTENT	DESMEE OF SATURAL	TYPE	STREM	TH PARAME	TERS Frietion	EFFECTIVE	
	IMPEX IMPEX	WET DRY	TIMINOS	§ 8	8 3	TEST	COMPRESSION	CONESION	AMOLE	STRESS	
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n	07-										
P	bet						·				

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	PROJ	ECT N	ame: <u>C</u>)lia Ec	>/Env	DAT				S ES OG		PROJECT NO.	: 340	8. 🖘
3.				Final								SAMPLE NO.:	FPI	-4
		PTH		MPLE CLA						DESCRIP				
	0	-2"		ML	-	1	D rn	5:11 YR 3	t w/3/2	fm	e roots	· (Top s	•: l)	
٠	2-1	9 "		C	L ,	V	ery <	st-f	f,e	lu. b	rn Cla	y w/ son	a 511	14.
						1 7	Fom	જ્ર"	- 19	" ab	l. +	fine bli	1	
	19-	23'		Sm-	SC		Rust	بر 4 د،	orn,	sil	ty f YR4/6	- Sa-d	w/ s	ione
	E	VD					C	•		7.0	1~7/6			
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ŀ									SULT	<u> </u>				
	Sample Depth	Liguid	PLASTIC	PLASTICITY	UNIT	WEIGH	TS BOUWART	CONTENT	DESNEE OF SATURAL	TYPE	UNCONFINED	GTH PARAME	PRICTION	EPPERME
	///i-13	LIMITS	LIMITS	HWDEX				30	- 6	TEST	COMPRESSION			-
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ASSOCIATES

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PROJ	: IECT N/	ME: D	lin Eco	/ENV	DAT	E:	7/2/	84			PROJECT NO.	<u> 3408</u>	.00
			Final f	•			-		·		SAMPLE NO.:		
DE	PTH	SA	MPLE CLA	SSIFICAT	ION				DESCRIP	TION			
·	÷						ph	oto	I	٠ ١٥			
0 -	12"		ML		1	DK. b Slight	ira, ilu	cirr 20t1	P1 - - t+	s:1+	w/ tr	v.f. so	md,
12"	20*		ML - (٥ ١ '	? T	some satur latter 31k, d 2" lay	eted fa	. W.	sy:	nottles comes 2.5/2 saturate steme @	are four out when few said sitt and 12° 5' 15"	and who squeet shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be a shall be shall be a shall be a shall be a shall be a shall be a shall be	teh are ged. b. ures?) - 18"-
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ENT	2_		••			•				water	at pond	الملكة	
							erm Total			· · · · · · · · · · · · · · · · · · ·		<u> </u>	
	<u> </u>						TRE		3				
SAMPLE DEPTH	LIGUID	PLASTIC	PLASTICITY	WET	DEY DEY	TS SOUTHANT	CONTENT	DEBNEE OF BATURAT.	TYPE	UNCONFINED	OCHESION	PRICTION	STREETINE STREET
C-2.	Limits	LIMITS	HOEX	33.			3 6	. g	TEST	COMPRESSION			

•	Dlin Eco/ENV	<u>.</u>
BAMPLE LOCATI	ON: Final Pand I I	DESCRIPTION SAMPLE NO.: FPI-6
0-7"	ML	Silt, dark brown (542.5/1) with trace organics, roots - topsoil
ר''- 12"	ML	Silt, medium gray-brown (54R3/1) scattered roots and fibers
12"-25"	ML	Silt, medium yellow-brown (10484/2) trace of mottling along root channels
		•
		Photo IC2
	•	Atterberg Can 6
		TEST RESULTS

SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	TS	35	RE PAR		STREN	TH PARAME	TERS	
DEPTH		PLASTIC	PLASTICITY MOEX	WET	DRY	BOUNKIT	THOS	PES ROTO	TYPE	COMPRESSION	COMESION	PRICTION AMOUNT	STRESS
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SAMPLE LOG

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PRO	ECT N	AME : (^)	line	co/E	IV. DAT	5A1 :	MPL _7//	KY	.OG	1	PROJECT NO.	340	g. cas	
			Fina	. (WE	-G		SAMPLE NO.:	FPI	-7_	
DE	PTH	S	AMPLE CL	SSIFICAT	ION				DESCRIP	TION			,	
0 -	-6"		C	L		m.Hl. silt.	ed y cl	DI	5	n w/ 11 42.5/2				
6 -	17"	' -		L	7	Dk. Color	brn grd 54	2.5	tiff into'	clay next low	. Some	- fine rvel.	roots.	
17"-	-24 "	'	ا	-		Olu. bra clay. stiff.								
EZ	9					•	10	1R 3		-				
			· · · · · · · · · · · · · · · · · · ·	_		TES		SULT	S					
SAMPLE DEPTH			LIMITS	1	WEIGH		CONTENT	DESNEE OF SATURAL	TYPE	STREM	COMESION	PRICTION	EFFECTIVE	
Ser in	LIMITS		X30NI	WET	DRY	BOUNNET	88	8 8	TEST	COMPRESSION	COMESION	AHOLE	STREES	
MT-5 21-24			·							,				

PROJECT NAME: Of in Eco/ENU DATE: 2/1/84 SAMPLE LOCATION: Final And | LOGGED BY: WE C SAMPLE NO.: FPI-8 SAMPLE CLASSIFICATION Photo IC5 moist, firm, dk elv: brn silt. Bottom ML 1" is banded brn of blk and contains ~50% v.f. sand, 542.5/2 9"-19" SM brn. f. sand w/ some zones of blk soundy S: It. Some 65 sound included. Some hard blk pieces up to 3/8" seem to be coal. 2.544/4 - 2.542/0 19"-25" Yellowish-bra. f.-m. somb and silt. w/ SM some clay. 2.544/4 END Perm 19-25" TEST RESULTS

SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	TS	35	4.5		STREM	STH PARAME		
DEPTH	LIQUID	PLASTIC LIMITS	PLASTICITY INDEX	WET	DITY	BOUNNIT	98	205	TYPE	UNCONFINED COMPRESSION	CONESION	PRICTION	STRESS
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16-19													
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SAMPLE LOG

PROJECT NAME: Olin ECO/ENV DATE: 7-1-84 PROJECT NO: 3408,00

AMPLE LOCATION: Final Panel I LOGGED BY: PSW SAMPLE NO.: FPI-9

SAMPLE LOCAT	ON: FINAL FONCE	COGGED BY: PSW SAMPLE NO.: PST 7
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0-2"	SM	Sand, medium yellow-brown (1042 4/3 4) fine grained, with a little silt, a little subangular to subrounded gravel,
2"-10"	CL	friable, moist Clay i medium yellow-brown (2545/2) with a little subangular gravel, moist, firm, with scattered sandy pockets
19"-26"	ML	Silt, medium yellow-brown (10425/2) scattered mottling, roots
		Photo IC4 Atterberg Con MT 29

S	AMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	rs	ENT	3.5		STREM	TH PARAME		
C	EPTH	LIQUIO LIMITS	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	SOUWIT	1000		TYPE	COMPRESSION	COMESTON	PRICTION ANGLE	STRESS
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PROJECT NAME	DIO ECO ENT	DATE:	PROJECT NO.: 3 701.
SAMPLE LOCATI	on: Final Pond 1	LOGGED BY: WFC	SAMPLE NO.: FPI-10
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION	
: :0-4"	SM	Brn. In -med soud lensed of dk. bm	
4"-25"	MK - OL	الملا على المحمد من المالحة	ones. Soft silt. At from above.@ 5", 10"
J 5 ^ - 27"	SM	black, partially deed stemsand for two	yed leaves & leave 15. In layers @ 10" \$ 19" t. gry, fine clay on 5: 1t.
END		104R2/1 Perm 19/2-2:	5
		TEST RESULTS	
		TELME	STRENGTH SABAMETERS

SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	TS	35	2.5		STREM	STH PARAME		
DEPTH		PLASTIC	PLASTICITY INDEX	BET	DRY	BOUNKT		2020	TEST	COMPRESSION	CONESION	AMOLE	STREES.
C-1		Non-											ļ
70-43		Plas.										}	Í
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PROJECT NAME: Olin Eco/Euu DATE: 6/29/84 PROJECT NO: 3408 04 SAMPLE LOCATION: End Pul 1 LOGGED BY: WFG SAMPLE NO .: FPI-II DESCRIPTION SAMPLE CLASSIFICATION Photo IA16 OL (OH?) Dk, gray - 'blk. organic silt, organic sull. 542.5/1 0-11 Brn silty day w/ gray and. CL - CH blk. molles. Soundy zones @ 15-16" and 19-20". A 1" churty pebble@ 7". 544/3" :. Roots end ~ 11". Bin. silty fine sand w/ gray nother 21-28" 2.574/4. Tr. sadstn. gravel. EMD TEST RESULTS

ATT	ENDEN	LIMITS	UNI	T WEIGH	73	1.3		STREM	STH PARAME	TERS	
	LIMITE	PLASTICITY	WET	987	BOUNDET	803	TEST	COMPAGENCY	CONTRIBU	MONTE	STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET
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	Liburo			LIGUE PLASTIC PLASTICITY					LIQUID PLANTIC PLANTICITY	LIGHTO PLASTICITY	LIGHTO PLASTICITY PROTECTION

SAMPLE LOG ECO/ENV DATE: 6/29/84

PROJECT NAME	Dlin ECO/ENV	DATE: 6/29/84 PROJECT NO.:3408.00 LOGGED BY: PS 4 SAMPLE NO.: FPT-12
··· DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
74.3. 14.3		. Photo IA-22 (2)
0-6"	ML	Silt, black (54225/1), with some fine
6"-11"	ML	Silt, dark gray-brown (254.312) with a little fine sand
11-28.5"	. ML	silt, medium gray-brown (544/2) with orange mattling (25424/6).
		•
	·	
		Perm sample 17"-23" Atterberg Pan M-1
		TEST RESULTS

SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	TS		P. B	L	STREM	STH PARAME		
DEPTH		PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOVINIT	100 100 100 100 100 100 100 100 100 100	202	TYPE	COMPRESSION	CONCOLOR	AMOLE	STRESS
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ASSOCIATES SAMPLE LOG

	PROJ	ECT N	ME: Q	lin E	CO/ENV	_ DAT			9 - 8			PROJECT NO.	340	3,00		
					Pond						 ;	SAMPLE NO.:	FPI	- 13		
	DE	PTH	5/	MPLE CLA	SSIFICATIO	N				DESCRIP	TION					
		12 11						· F	ho	los	IA 18	(2)				
	0-	/z"		ML			silt, roots		_		opso:1) 4R3/2		FAR			
	1/2"-	24	"	nL		5	silt with some	me oran	edium yae	gra syr	ny-brow 25/6 m d seam	n 254 nottling	4/2 ,	۲		
	24"-	30"		SM			Sand, medium brown 10 YR 4/4, with a little silt, fine to medium grained									
	30-	-3Z		SP	-	5	Sand, med. yellow-brown 1045/4 with a trace of silt, fine to medium grained									
						A	ltfer	berg	, <u> </u>	ampl	le Pan 7'-13"	5-6				
						17					7-13					
		,							SULT	5						
	SAMPLE DEPTH	LIQUID	PLASTIC	PLASTICITY	UNIT W	EIGH	BOUBART	CONTENT	202	TYPE	STREM UNCONFINED COMPRESSION	ODMENON	FRETTON ABOLE	STREETHE STREETH		
		UNITE	LIMITE	MOEX				20		1631						
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4														Company		
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ASSOCIATES
SAMPLE LOG

			12 Le									PROJECT NO.	. <u>340</u>	8.00
	_		Final			OGGED BY	_	7				SAMPLE NO.:	PPE	-14
DEPT	H	34	MPLE CL	LSSI FICA	TION					DESCRIP'	TION			<u> </u>
						pl	انص	~	王	P27	7			
0 - 12 :	١ ا ا		M	_		Brn.		3 2	14	(t.	op soil)	. Rooks	• 19	
12 =	19"		CL								som d			
			•			22	βr	۸,		544	•			
19"-3)3"		SM	١		Dk.	Pr	n	gr	avell 543	ly sam	.d	d sit	7, - (
End														
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	_													
						TES	ST	RE	SULT	S				
SAMPLE	ATTER	BERG	LMTS	UN	T WEIG	HTS			2.2			STH PARAME		
מבי אדפס		WITE WITE	PLASTICITY MOEX	WET	DITY	SOUTH		8	OCONCE OCO SATURAL	TYPE	COMPRESSION	COMESION	AMOLE	STRESS
													1	

SAMPLE	ATT	ERBERE	LIMITS	UNI	T WEIGH	TS .	1 2 P	2.5	Í	STREM	STH PARAM		
DEPTH	LIQUID	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	SOUNIT	THEOR .		TYPE	COMPRESSION	CONESIGN	Anoli	STRESS
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PROJ	ECT NA	ME: D	in Eco	/ENV	DA1	TE:	6/3	0/8	<u> </u>	F	PROJECT NO.:	3408	••	
			FinalP								SAMPLE NO.:	FPTI		
30	PTH	SA	MPLE CLA	SSIFICAT	'ION				DESCRIPT	TION				
						1	Phot.	o .	∓B10	6				
ю – :	6		ML			lam	ina ture	Atac Sa	.S , (t w/ b	Sod w/	root	S	
6 "- 1	13"		ML			Fractures approx. parallel to laminations. 542.5/2 Dk bra to blk, crumbly, silt, w/ blk pieces up to 76" w/ sub-conchoidal fractures. (corbon charmal?)								
-	18"	•	SC			Brn.		-منهو		on char, saudy	c., 🕶 ')	3 YIC	.l 2.5/1	
18".	- 23		5	P		Ang, weathered snottin gravel and sand. Tan-(yellowish) 54R 6/8								
En	14				Sand. Ian - (yellowish) ITR 6/8									
<u></u>						Porn	20	<u> </u>	-6"					
								SULT						
SAMPLE	ATT	ERBFRA	LIMITS	LIMIT	T WEIGH					STREM	GTH PARAME	TERS	·	
DEPTH			PLASTICITY	WET	DRY	BOURNIT	CONTENT	DEBREE OF BATURAT.	TYPE	UNCONFINED COMPRESSION	CONESION	PRICTION AMOLE	STRESS	
L-5												·	·	

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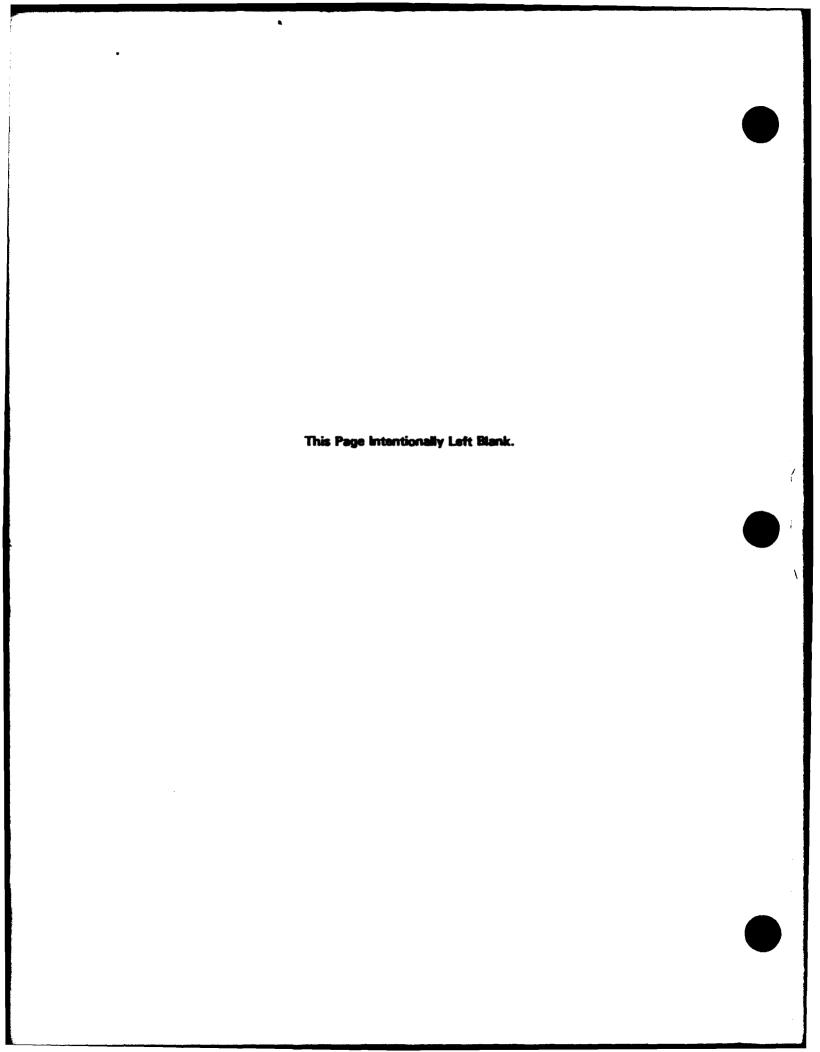
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ASSOCIATES SAMPLE LOG

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PROJ	ECT NA	ME: D	Im Ec	a/ENV	_ DAT	E:	7/	1/8	4		PROJECT NO.	3409	60	
SAM	LE LO	CATION:	Final F	Pond_	_ L00	GED BY		البا	F &		SAMPLE NO.:	FPI	-2	
DE	PTH	SA	MPLE CLA	SSIFICATIO	N			l	DESCRIP'	TION				
			,a			Photo	•	I	29					
,0 -	&: *		ML		1	ok, b)רא	5:1	1+	Tap 2"	top so:	1. Fr	an	
:						3 "-34	S	1:7h	1 -	-ination	s are v	isible	•	
					- ['	prese	wt.	Abbra	ar t	colored to be re	esidual i	weath	cred	
		 -			F	rom 3	3 °°-	st ar	e fo	ng the und crum	-bly black	chuml	رج با م	
					1	that road: by break when touched. Resemble carbon. It beaus a black streak and does not								
,,	•				٤	behave like weathered rock, 10 4R 3/2								
8-	14"		ML	-	t)K bṛn	5:1	t. c	ا بالد	few ligh	nt weathe	red or	eas	
					ď	Zone had fine voids laying horizontally giving								
					3	some hint at budding. Voids decrease as 14" is approached. 7.5 YR 3/2								
14" -	23"		5 M			14" is approached. 7.5 YR 3/2 Yellowish brasend layered w/olive gry silt. 1" Sold zone at top. Layers are -k". 7.5 YR 5/8								
						Sa-4 =	m	4	top. L	exers an	一~~~ k".	7.5 YR	5/8	
13 EM	<u>zs"</u>		SP							cs san				
						TES	T RE	SULT	S					
SAMPLE	ATT	ERBERG	LIMITS	UNIT Y	EIGH	TS	3 5	¥. §		STREN	OTH PARAME	TERS		
DEPTH			PLASTICITY INDEX	WET	DAY	DOUWNIT	MONSTURE CONTENT	DEBREE OF SATURAL	TYPE TEST	COMPRESSION	CONESIGN	PRICTION AMOLS	STREET	
C-16]	!		
4												•		
10-13														
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	PROJECT NAME: Olin Eco / ENV DATE: 7/2/84 PROJECT NO: 3408.00														
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SAM	LE LO	ATION:	Final	md2	L00	GED BY'.	_4	FO			SAMPLE NO.:	FPT.	-3		
30	PTH	SA	MPLE CLA	SSIFICAT	ION				DESCRIP	TION					
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. 0 -	16"		M	_		ok f	ን የ	s : †	- w/	organi	c deb	rrs.T	r. Sand.		
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		1				5 10	mg	oy.	1/4 W	bood.	72.5/2	_			
16-	" م د		~ 1		., ا	Olv. bra, sandy, silt. (non-homogeneous).									
	- - -		ML			Some	ノスマ	, 304 ~8 A	ray,	silt. (n	on-homo	genico: /2	(3).		
EN	Α					Some zones very clayey. 545/3									
						Sanp	اء ۴	raha	~ I~	4" wat	er,				
								_							
							Per	m 6	22 - 2	LG "					
						TES	T RE	SULT	'S						
SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGHT	rs	CONTENT	DESPEE OF SATURAL			TH PARAME				
DEPTH	LIGUID	PLASTIC LIMITS	PLASTICITY INDEX	WET	DWY	BOVINIT	88	20.2	TYPE	COMPRESSION	CONESION	AMOLE	STRESS		
c-3															
										·					



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	DIECT NAME: Olta Eco/ENV						MPI	CIAT	ES	2.44		a gra	
		(New E	· ·/F	.	- •					PROJECT NO.	340	y on ?
			Final P								BAMPLE NO.:		
	PTH					GED BY			DESCRIP.	TION	PENTLE NO.		
- DE	FIR	- 5	MPLE CLA	SSIFICAT	ION				DESCRIP				
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B"_	19"		SM		; ;					and s			
15"-	5"-24" ML					Grav Ned	. 73 5	ryr	2.5/. Sil1	ering 5	me sa	٠,٠	
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										raction w	a 24"	W/no	בימולים
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Sample Depth	ATT	PLASTIC	PLASTICITY		WEIGH		CONTENT	DEBNEE OF BATURAT	TYPE	STREN	CONESION	PRICTION	CFFEOTINE
	LIMITS	LIMITS	IMDEX	WET	DRY	BOUNNIT	88	2 2	TEST	COMPRESSION	- Company	MOLE	STRESS.
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5-5													
-34"		,											

PROJECT NAM	E: Olin BAAP	DATE: 6/28/84	PROJECT NO.: 3408. 08
SAMPLE LOCA	ation: Final And 3 1	OGGED BY: WEG	SAMPLE NO.: FPITI-2
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION	
		Photo IA13	
0-12"	₹Ŵ	Dark brn silty f	n saud.
12" -27	SP	Lt. Br. = fin	e sand.
End		7.5 YR 6/4	•
		Perm Sample 7-	12"
		•	
		202 000 120	
		TEST RESULTS	
	RBERG LIMITS UNIT WEN	GHTS EE BOO TYPE UNCON	STRENGTH PARAMETERS

SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	TS		REE.		STREM	STH PARAME		
		PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOUWART	TESOS TESOS		TYPE	COMPRESSION	CONTRION	AMOLE	STRESS
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0-12"		Non											
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SAMPLE LOG

	TION: Fruit Pout 3		PROJECT NO.: 7408.60 SAMPLE NO.: FP III - 3
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION	
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	DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
The Park of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Contr	5" 0	CL	Photo II315 Olv. bra silty clay by to from sand. Roots to 3". Slightly mothled. & stiff. 544/3
	5"-8"	CL	V. Stiff sand and clay w/tr. grav. Olu, brn. Clay binder is v. plastic.
	8"-28"	SM	Brn. silty fine sound of the Tr grav. @ 12 - 20". Cs sound &
	END	-	up to 21/2" of grav from 20"-28". 2.545/6

	STRENGTH PARAMETERS						UNIT WEIGHTS			ATTERBERG LIMITS			SAMPLE	
STREET	AMOLE	COMESION	COMPRESSION	TYPE	200 A	TEROS	BOUWANT	DRY	WET	PLASTICITY INDEX	PLANTIC UMITS	TIGHIS TIGHIS	DEPTH	
													L-3	
			·											
													5"	
											·			
			·								·		5 "	

ASSOCIATES SAMPLE LOG

	Olin EcoleNV		PROJECT NO.: 3408,00 SAMPLE NO.: FPTV - 4
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION	Source Ro.
0-12"	(OL) ML ML ML SM	Silt, dark brown, wierganics 1048-2/1-5ilt, dark brn 1048-3 Silt, dark brown, was gravel, fine roots Sand, silty, stratified, yellow brown see brown matrix 1041	ith sand and 104R 3/1
	•	Photo IA 17 Perm somale 13°-18'	
		Perm sample 13°-18' Atterberg Pan 5-1	9

											لسمور وسيدوس		
SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	TS	35	A E		STREM	TH PARAM		
DEPTH	LIGUID		PLASTICITY INDEX	WET	DRY	BOUWHIT	COST	202	TYPE	UNCONFINED COMPRESSION	CONCRION	FRIGTION ABOLS	STRESS
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PROJECT NAME: Olin Eco/Env Date: 6/28/84 PROJECT NO: 3408

SAMPLE LOCATION: Final Pend 3 LOGGED BY: WFG SAMPLE NO.: FPIII - 5

SAMPLE LOCAL	UN. EIBELING	COSED BI
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
		Photo IAS
0-12"	ML	Brn. soudy 3:1t, stiff. Enerosing soud downward. 54R 3/3
rp - 26"	SP	Light Brn. fine-med. sand. 2" at
END		bottom is moist gravelly, silty sol.
	- .	

SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	TS .	55	7.3		STREM	3TH MARAME	TERS	
DEPTH	LIGHTS	PLASTIC LIMITS	PLASTICITY INDEX	WE 7	DRY	BOUNNIT	MOLETURA CONTEN	DES.	TYPE	UNCONFINED COMPRESSION	CONESION	AMOLE	STREES
4	S-10	Non- Plast.	·									Per-Volume	-

SAMPLE LOG

	Olin BAAP on: Final Pond 9 1	ATE: 4/28/84 .000ED 8Y: WFG	PROJECT NO.: 3408. 44 SAMPLE NO.: FPIII - G
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION	• •
Ø - 20°	mL.	mottle @ 2"-4".	Jey Silt W/ dk brn. 15" gravel piece 14 silt@ 16". Some 54R4/3
20- 24"	. 5P	gravel present. Lt. brn sand w; 2.544/4	
END			

EFFEDINE STREAM COMPRESSION BOVINIT WET DITY 30-24 NP

ASSOCIATES

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SAMPLE LOG :- 6/29/84 ED BY: WFG

SAMPLE LOCAT	ION: F-/ A AL TONG 3	LOGGED BY: WATE NO.: 1 P 20 1
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0-5"	m∟	Photo IA26 = (un-numbered) Dk. Brown silt w/ a few blk laminating
:		Very fine soud increasing toward both w/ tr grav. 3"5" depth. 2.543/2 roots
5-22"	S P	brn gravelly, silty fine sand.
Evq		. 74

SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	TS	35	7.2	l	STREM	STH PARAME		
DEPTH	LIGUID	PLASTIC LIMITS	PLASTICITY MOEX	WET	DRY	BOUNKT	MOSTU CONTE	20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00 20.00	TEST	UNCONFINED COMPRESSION	CONESION	PRICTICAL ABOLE	STREETING STREET
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SAMPLE LOG

PROJECT NAME: Olin BAAP DATE: 6/28/84 PROJECT NO.: 3408.00

SAMPLE LOCATION: Final Find 3 LOSSED BY: WFG SAMPLE NO.: FPET-8

DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0 - 12"	M L	Dk.brn silt w/ tr. gravel. Lawer 6" mottled w/ !t. brn silt.
12 -18"	mL	54R 3/2 It. brn silt. w/ some dle.brn mottles. 54R 4/4
/¢"-24"	mL	DK.brn. silt as in 0-12" above, bottom 1" has 15-35% for sourd.
End		Color ad 0-12" but w/ dk mottle of 5YR 2.5/2

SAMPLE	471	PERSER	LIMITS	UNIT	T WEIGH	TS	55	15.5		STREM	ITH PARAME		
DEPTH	LIMITS		PLASTICITY INDEX			BOUWLIT	98	202	TYPE	COMPRESSION	COMESION	AMOLE	STRESS
55-50													•
13-15"													
		1			ŀ					•			

SAMPLE LOG

PROJECT NAME: Olin ECO/ENU DATE: 6-29-84 PROJECT NO: 3408.00

SAMPLE LOCATION: Final Pond III LOGGED BY: PS LJ SAMPLE NO: FP III - 9

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DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION .
0-6"	ML	Silt, black (7.542 2.5/0), scattered gravel, roots
6"- 16	ML	Silt, dark brown (10 YR 2/2) with a little sand and small gravel, roots
16-23"	54	Sand, dark brown (7.5423/2), with silt
23-29"	sP	Sand, medium brown (15 YR 3/4), fix to coarse grained, trace silt and small gravel
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SAMPLE	SAMPLE ATTERBERG LIMITS				T WEIGH	TS		12.5	STRENGTH PARAMETERS						
DEPTH	LIGUID	PLASTIC LIBETS	PLASTICITY INDEX	WET	DRY	DOVINIT	TEOS SOFTE	202	TYPE	COMPRESSION	COMENION	PROCTION ABOLE	EPPEDINE STREET		
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							Perm	Sq	mple	2 7	12-2	8"			
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			•				TES	T RE	SULTS	3					
r	SAMPLE			S LIMITS	UNI	T WEIG	нтз	CONTENT	E S				H FARAM		1
	CEPTH		PLASTIC	PLASTICITY	WET	DAY	THANOS	8	8.2	TEST	COMMESS		COMESION	Anolg	STREES

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	SAMPLE LOG PROJECT NAME: Oha Eco/Env Date: 6/30/84 PROJECT NO.: 3408.00														
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Ens	٥.			-						, , , ,					
						TES	T RE	SULT	S						
SAMPLE			LIMITS	UNI	T WEIGHT	TS	CONTENT	DESMEE OF ACTURAL		STREN	TH PARAME	TERS			
DEPTH	LIGHTS		PLASTICITY HIDEX	WET	DAY	BOUNANT	88	8.5	TYPE	COMPRESSION	COMESION	AMOLE	STRESS		
		Non- Plass													

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PROJECT NAME	·Olin Eco/E	NVDAT	re:_6/3	50/	84_			PROJECT NO.	<u> 3408</u>				
SAMPLE LOCATI	101: Fral Pond	<u>:3</u>	96ED 6Y:_		WF	<u></u>		SAMPLE NO.:					
DEPTH	SAMPLE CLASSIFIC	CATION				DESCRIP	TION						
0 - 11 "	SM		Dk.	brn	5 ;	IB	f e s 5 4 2.5/8	-4. (7 L	Top So	:1)			
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End			2.5	5 Y	5/6		-			•			
			TEST	r RE	SULT	' S							
SAMPLE ATTERS	IERS LIMITS	UNIT WEIGH	ITS		# # #		STREM	STH PARAME	METERS				
DEPTH LIQUID PLA	HITS PLASTICITY WET	T DAY	BOUNNIT	8	205	TEST	COMPRESSION	COMERIGN	AMOLE	STRESS			

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DEPTH		PLASTIC LIBETTS	PLASTICITY INDEX	WET	DAY	BOUNANT	UTBICO CONTE	200 as	TEST	COMPRESSION	COMESION	AMOLE	STREET,	
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77-3														
3-9"														
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PROJECT	NAME: _	<u>Olia:</u>	Eco/E	NY DA	TE:	4	28/	84		PROJECT NO.	:3408	. ••
		: Final F								SAMPLE NO.	FPM	-13
DEPTH	:	SAMPLE CL	ASSIFICA	TION				DESCRIP				
0-4" :		mL					エル ゴ ik.	-	grow r 54R 2	oots.		
4"- 12"		mL			BIK	, Sa	-dy	s;	1+.	54R 2	.5/1	
12"-23	"	ML	•	j		5 Y	R 3	5/2	ļ w/		- d.	·
END				,	Perm	, 5°	p	le	18-23"	,		
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			_					<u></u>				
					TES		SULT	S				
AMPLE AT		E LIMITS	UNI	WEIGH	TS	MOUSTURE CONTENT	DEBREE OF BATURAT			STH MARAME		
LIMIT		HIDEX	WET	DRY	THARTOS	§ 8	8.3	TEST	COMPRESSION	CONESIGN	ABOLE	STREETINE STREETINE

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			EndBa				,	•			SAMPLE NO.:		
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7 - ĖN			ML		-		5 Y R			fn. sem	.d-		
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						TES	T RE	SULT	'S				
SAMPLE			LIMITS	UNI	T WEIGHT	rs	MOUSTUME CONTENT	DESIGNEE SCTURAL			STH PARAME		EPHOTIN
DEPTH		LIMITS	PLASTICITY	WET	DWY	BOUNNIT	88	8 3	TEST	COMPRESSION	CONESION	ABOLE	STREES
5-88 9"		·											·

ASSOCIATES

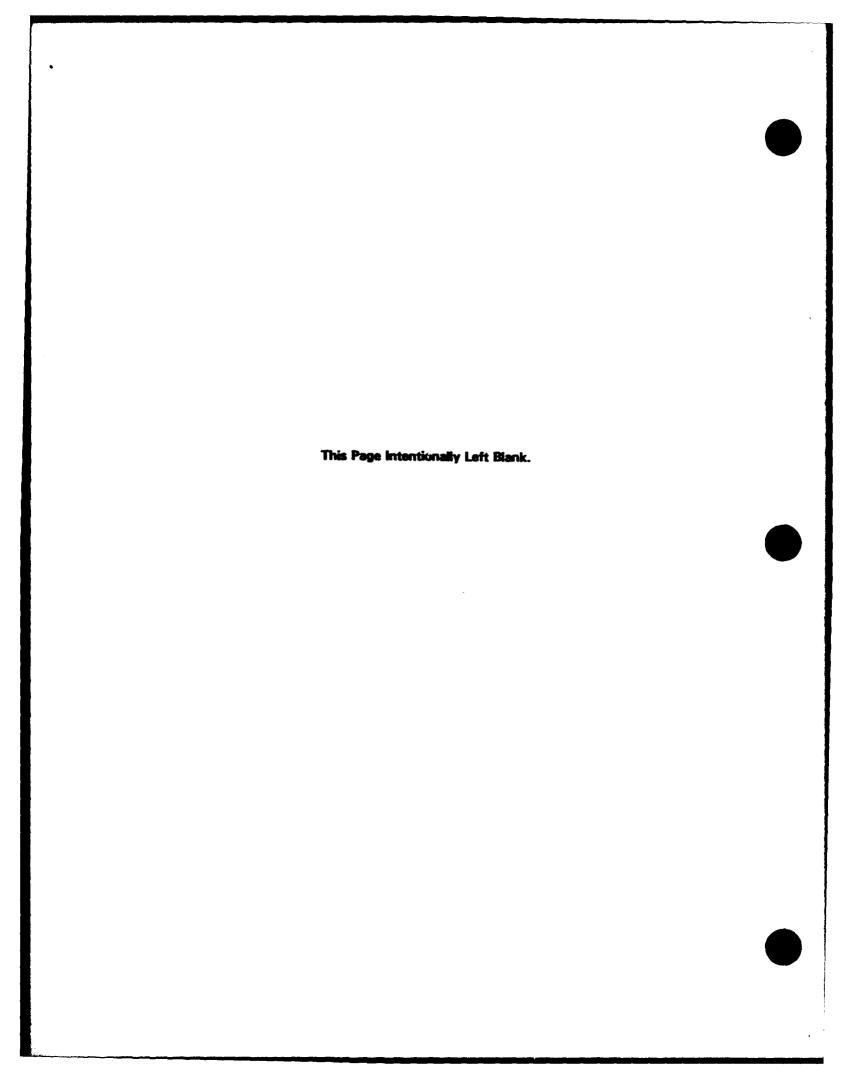
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SAMPLE LOG

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PROJ	PLE LO	CATION:	llu En Final Pa	4 3. b	DAT	E:	ب اخة / ه سا	FC			PROJECT NO.: MAMPLE NO.:		
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0-	11 "		<u>s</u> M	-sc	1	alter	ly notin	brn	- gry	fine s of dk 104R3/1	soud l	but i	contain sill w/
11 - 1 ·	16"		Μ	L		Firm		br. 42.		alk silt	- w/ 1r	fine	Saud.
Eug	26"		SP			3-2	f,	L	med 4/2	sand	ir of	ang, f	in grav,
					·				-				
						TES	T RE	SULT	'S				
SAMPLE DEPTH			LIMITS		T WEIGH		CONTENT	DESMEE OF SATURAL	TYPE	STREM	TH PARAME	TERS	DIFFORME
JEF IN	LIMITS	LIMITS	KSCH	WET	DRY	SOUWART	§ 8	8 3	TEST	COMPRESSION	CONESIGN	AMOLE	STRESS
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0	-2"		SF	>							- grav. 10 YR		14.
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SAMPLE DEPTH		ERBERG	PLASTICITY	UNI	T WEIGH	тз	CONTENT	DESNEE OF SATURAL			GTH PARAME	TERS	
JEP 18	Labora	LIGHTS	HOEX	WET	DRY	BOUNNIT	<u>\$</u> 8	8 3	TEST	COMPRESSION	CONTRICT	AMOLE	STRESS
m-9	-9 21 ^a												

SAMPLE LOG

PROJECT NO.: 3408, 00 6/30/84 PROJECT NAME: DIN ELO ENY DATE: SAMPLE NO.: FPII-2 LOGGED BY: WEG SAMPLE LOCATION:. SAMPLE CLASSIFICATION Photo IB5 DK. greenish brown sandy silt. crumbly. ML Some scaffered vithin lamellee of lighter silt. 543/1 Dk dr. blk, crumbly silt (no soud). Multiple ML frue roots 54 3.5/1 BIK silt w/ tr. sand. multiple fine ML roots. 2.542/0 でるり Pern @ 13"-17" TEST RESULTS

SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	TS	35	# \$	İ	STREM	STH PARAM	TERS	
DEPTH		PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOUNNIT	88	20 PE	TEST	COMPRESSION	CONCRION	PRICTION	STREES
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2-9"						1							
2-4										. 1			
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SAMPLE LOG

PROJECT NAME: Olin Eco/ENU DATE: 7/1/84 SAMPLE LOCATION: Find Pond DESCRIPTION SAMPLE CLASSIFICATION photo IB23 Olubra - black, stiff, silty, day. Slightly crumbly. Fine roots through 0-12" Zone. 542.5/2 Olive-brn, stiff, silty clay. A few frue roots present. 5-44/2 END TEST RESULTS ATTERBERG LIMITS UNIT WEIGHTS STRENGTH PARAMETERS SAMPLE LIQUID PLANTIC PLANTICITY LIMITS INDEX

ASSOCIATES SAMPLE LOG

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PROJECT NAME	: <u>Olim</u> :	ATE:	7/1/84	PROJECT NO.: 3408.60
SAMPLE LOCAT	10N: Final Pond 4 1	LOGGED BY1	WFC	SAMPLE NO.: FPTV-4"
DEPTH	SAMPLE CLASSIFICATION		DESCRIPTION	, "A+-
:o -26 "	C.L		to blk sil	ty clay w tr. v.f. sand.
,		Fine ro layer of of fine	ets thru z lighter cole roots. Dar	one. At 7"-8"; s or (brn.) w/ concentrate leer zone 10"-18":
		í .	or 5725/2	11. Remainden
END	•			
·		Perm	@ 8"-14"	- -
		TEST R	ESULTS	
		1 05	Tw WI	

SAMPLE					T WEIGH	TS	35	ă ă						
DEPTH	LIGHTS	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOUNNIT	SORTU CORTU		TYPE		HOMESHOD	AMOLE	STRESS	
A-2														
W"-18 ⁴														
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PROJ	ECT N	AME: C) in Ec	O/EN	L DAT						PROJECT NO.	3108.	<u>60</u>			
SAM	PLE LO	CATION:	Finel	Pard	1 Ր00	GED SY	<u>_w</u>	FB			SAMPLE NO.:	FPI	-5-			
DE	PTH	5/	AMPLE CLA	SSIFICAT	ION				DESCRIP'	TION						
					- ['	photo										
0 -	· 13"		Mi	L	.	10 fr t	Son To M YR3	طع : موط. ۱/۱	s:1+ Roo	u/tr	grav. roughou	Sad Lin	is levul.			
13 ″-	- 24		<i>CL</i>	-		Dk. brn, 1. stiff clayer sit u/ some 1.f. sand. Zone @ 19-21" container cs sand & growel. Also contains fine rots 5 4 2.5/1										
34 -	26	•	SP	•	,	Lt. ben gravelly, fine sand.										
End	1															
يت السنويين						·										
			- ··· ··			TES	T RE	SULT	·s							
AMPLE			LIMITS	UNIT	WEIGHT	EE 285										
DEPTH	TINUES TOTALS	LIMITE	HOEX	WET	DITY	BOUNNIT	8	8 3	TEST	COMPRESSION	CONESION	AMOLE	STRESS			
MT-1 16-19	9									·						

ASSOCIATES SAMPLE LOG

PROJECT NAME	e. Olin Eco/En	DATE:	6/30/	54		PROJECT NO.	: 3408	3.00
SAMPLE LOCK	non: Final Pond	LOSSED BY	<u> </u>	= G		SAMPLE NO.:	FPM	ے د
DEPTH	SAMPLE CLASSIFICA	TION		DESCRIP	TION	·		
0-44	mL	Dk. 6		lt w	/ tr s. whea . c.	I		in certii.
4" - 33 "	CL	Dr. 1	lamellae.	Fix	Slightle roots	through	out.	
33 -Je.,	ML	BIK,	crumble). 2.	y si 542	lt u/ /o	fine s	and (ítr -
END								
		TES	T RESUL	TS				
MAPLE ATTER	DERS LIMITS UN	T WEIGHTS	CONTRACT BESIEVE BETTERE	TYPE	STREM UNCONFINED COMPRESSION	CONESIGN	TERS PROTION ABOLE	EFFECTIVE STREAM

22 - 36

AYRES ASSOCIATES SAMPLE LOG

PROJECT NAME: Alia Eco/ENV DATE:___ PROJECT NO.: 3488.00 SAMPLE LOCATION: Finel Pond 4 SAMPLE NO.: FPTY - 7 SAMPLE CLASSIFICATION Photo IB 22 Gry-brn clay. At 9" is a 1" Zone 0-23" of silty , v.f. sand mixed w/ clay. Top 5" is root zone. 542.5/2 BIK, silty clay of to sound. 93-28" 2.542/0 u/ 1" zoned 542.5/1 End

SAMPLE	TH LIQUID PLASTIC PLASTIC			UNIT WEIGHTS		35	7 2	STRENGTH PARAMETERS					
DEPTH	FIGURE THOUSE	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	SOUNNIT	800	202	TYPE	COMPRESSION	CONESTON	ANGLE	STRESS
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				• 1									
0-1			·										
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3-25		·											

ASSOCIATES SAMPLE LOG

PROJECT NAME	· Olin Eco/ENV	DATE: 6/30/84 PROJECT NO.: 3408,00
	1011: Einel Parl 4	
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
		Phito IB8
:0-10"	ML.	Dle. brn silt w/ tr sand. A few roots, mostly in top 4". 12" o plant stem @ 10". 10 YR2/2
10"- 26"	CL	Olu. brn silty clay. Firm to stiff. Slightly crumbly 10-14". Stiffing downward One piece 3" well rounded rocke 16-18". "" plant stem @ 19". Tr. smell ang. grav. below 20". 10 YR4/2
End		-
		TEST RESULTS
SAMPLE ATTERS	ERG LIMITS UNIT WEN	STRENGTH PARAMETERS

SAMPLE	ATT	ERBERI	LIMITS	UNI	T WEIGH	TS	35	F.E		STREM	TH PARAME	TERS	
DEPTH	LIMITS	PLASTIC LIMITS	PLASTICITY INDEX	WET	DAY	BOVIMIT	1500 1700 1700	20 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE 00 PE	THE	COMPRESSION	COMESTON	PRICTION ABOLE	STREES
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ASSOCIATES SAMPLE LOG

	E. Olin Eco/ENV	
		LOGGED BY: WFG SAMPLE NO.: FPIV-9
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0-104	ML	Photo IB25 Brn. crumbly clayey silt (top soil) W roots. 104R2/1
10"-16"	CL	Gry-brn silty clay. Gry 18" veins of clay scattered in lower 1/2 of zme Fine roots, in lower half. 5-42.5/1
6"-28"	ML	Blk sandy Silt. Some very fine roots. 2.572/0
End.		
		TEST RESULTS
SAMPLE ATTER	BERG LIMITS UNIT W	EIGHTS SE E E STRENGTH PARAMETERS

SAMPLE	ATT	ERBERG	LIMITS	UNIT WEIGHTS				STRENGTH PARAMETERS					
DEPTH		PLASTIC LIMITS	PLASTICITY HIDEX	WET	DRY	BOUNNIT	MOUSTLU COSTE	Se Se Se Se Se Se Se Se Se Se Se Se Se S	TYPE	COMPRESSION	CONESION	PRICTION	STRESS
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-7"													

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8		•	PROJECT NO.: 3408,00
SAMPLE LOCAT	10N: Final Pond 4 1	OBSED BY: UFB	SAMPLE NO.: FPTV-10
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION	· · · · · · · · · · · · · · · · · · ·
0-2"	2 C	Photo IA.12 moist. brn fine 2.543/2	•
2" - 30"	SP	Lt. tan fine san	٠ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ
ĖND		2.546/2	sample (M-23)
		TEST RESULTS	_
SAMPLE ATTER	DERG LINETS UNIT WEN	1 86 12 81	STRENGTH PARAMETERS

SAMPLE	MPLE ATTERBERG LIMITS UNIT WEIGHTS					TS	35	#_ \d		STREM	STH PARAME	TERS	
DEPTH	LIGUID	PLASTIC LIBITS	PLASTICITY MOEX	WRT	DRY	BOUGHIT	COST	202	TYPE	UNCONFINED COMPRESSION	COMESION	AMOLE	STRESS
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SAMPLE LOG

PROJECT NAME: Olin Eco/Env DATE: 7/1/84 PROJECT NO.: 3408.00

SAMPLE LOCATION: Nitro Pond Logged By: WFG SAMPLE NO.: NG-1

DEPTH SAMPLE CLASSIFICATION DESCRIPTION

DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0-7"	sm	photo IC7 gry, f. sand & silt. Silt component increases to bottom. Top 2" is near
7"-10"	ML/sm	saturation. V. Stiff, marbled dk brn 9 gry silt. I" vin of silt w/ 50% + of f. sand at R'é'-10"
11-26"	CL	Gry-brn, v. stiff clay, some v. fine
END		Sand, mostly in thin (16-18") layers from 19"-26". Soil tends to break apart on the sound layers. From 20"-24" RISO have varies of clay/silt = v.f. sand.

Perm 2-7"

SAMPLE						TS	35	ME PAT.	S! STRENGTH PARAMETERS !					
DEPTH	LIMITS	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOUNNIT	TE CO	1000 1000 1000	TYPE	COMPRESSION	COMESION	AMOLE	STRESS STREET	
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5-97														
-34													Ì	
						5								

SAMPLE LOG

PROJECT NAME: Ofin Eco/ENV DATE: 6/30/84 SAMPLE LOCATION: Nitro Pond SAMPLE NO.: NG-2 LOGGED BY: WFC SAMPLE CLASSIFICATION Photo IB 13 Dk. olv. grn clay w/ tr cs sand (ang.). over saturated in top 1:2". Saturated to about 7". Ly piece wood @ 12". Soft to firm, when unsaturated, 542.5/2 Dk du, gra clay (es above) but w/ brown clay mixed; in irregular lanses and smears. Stiff. Tr. gravel. 542.5/2 W/ 544/2

SAMPLE	ATT	ERBERG	LIMITS	UNT	UNIT WEIGHTS			PER.	STRENGTH PARAMETERS				
DEPTH			PLASTICITY 180EX	WET	DRY	BOUNNIT	TECOS	2000 2000 2000 2000 2000 2000 2000 200	TYPE	COMPRESSION	CONESION	AMOLE	STREES
m-37													
4-8"			·										
7-0													
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AYRES ASSOCIATES SAMPLE LOG

PROJECT NAME: Olin Eco/ENV DATE: 6/30 _ PROJECT NO.: 3408. 00 SAMPLE LOCATION: Nitro Pond LOGGED BY: WFC SAMPLE NO.: NG-3 SAMPLE CLASSIFICATION Photo. IB4 Olv. brn organic muck 1.3 oft & set. 04 dk. olu. grn. , stiff to v. stiff clay. CH Brn. Clay, stiff. Some durker zones toward bottom. Large, weathered, rounded <u>_</u>L andsta gravel, beginning 20"-29" 1783/3 Perm @ 16-20" **TEST RESULTS**

SAMPLE	SAMPLE ATTERBERG LIMITS			UNIT WEIGHTS				P. C.	STRENGTH PARAMETERS				
DEPTH		PLASTIC LIMITS	PLASTICITY IMDEX	WET	DRY	BOUNNIT	TECH	S OF S	TYPE	COMPRESSION	CONESION	ANOLE	STRESS
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M-7			·										
27										,			
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SAMPLE LOG

DATE: 6/30/84 PROJECT NAME: Oh BAAP SAMPLE NO .: NG-4 SAMPLE LOCATION: Nitro Fond LOGGED BY: LUFG SAMPLE CLASSIFICATION DESCRIPTION Photo IB2 ML Olive brn silt w/ some fine sand, Dryer w depth. 54 3/1 Olive to bon fine sandy silt w/ tr. grav. 91-14" ML Lower contact @ ~200 w/ horizon. Soud inc. to bottom. 543/2 14"- 19" Lt. Drn Sand, fine SP 2.594/4 Olive for sandy silt. Stiff. small dark 19-22" ML specks. Thin sandy vein@ 21". 544/4 END PERM 9"-14" TEST RESULTS

SAMPLE	ATT	ERBERG	LIMITS	UNI	UNIT WEIGHTS		35	7.5		STREM	STH PARAME		
DEPTH	LIMITS	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOUNNET	STREET		TYPE	COMPRESSION	CONCRION	AMOLE	STREES
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M-4									1				
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	Di	EPTH		AMPLE CL	ASSIFICA	TION				DESCRIP	TION			
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ŀ	SAMPLE	ATT	ERREP	G LIMETS	LBA	T WEIGH					STREM	STH PARAME	TERS	
- 1	DEPTH			PLASTICITY	WET	DRY	BOUMART	MONSTUNE CONTENT	DEBREE OF BATTURATE	TYPE	UNCONFINED	CONTRION	PRICTION	STREETHE STREET
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PROJECT NAME	Olin Feo/END	ORTE: 6/30/84 PROJECT NO.: 3408.00 CORRED BY: 4) F.C. SAMPLE NO.: NG-6
SAMPLE LOCATI	on: Nitro Pond-2 nery	CORRED BY: LIFE SAMPLE NO.: NG-6
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
	•	·photo IB 14
0-14"	'- CL	Olv. brn silt w/ some clay. Some fine roots 5"-9". 543/1
11-21"	5C-SM	Olu, brn. clayer sond. Sean of cleant fine sand w/ thin lamellae of clay from 16"-21", 543/1
21-24"	CL	olu. brn., stiff clay w/ fine varves of blk clay alternating w/ v.f. sand-silt. 543/1
End		543/1
		TEST RESULTS

SAMPLE	ATTERBERG LIMITS UNIT WEIGHTS						5.5	STRENGTH PARAMETERS					
DEPTH			PLASTICITY IMDEX	967	DAY	BOUWART	ALECO NLERON	9698 9478	TEST	UNCONFINED COMPRESSION	COMESTOR	AMOLE	STREES.
m-6													٠
11-16													
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AYRES ASSOCIATES SAMPLE LOG

PROJECT NAME: Olin Eco/Env DATE: 6/30/84 PROJECT NO: 3408.00

SAMPLE LOCATION: Nitro Pond - 2nda Logged By: L.) F.C. SAMPLE NO.: NG-7

DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
	·	Photo IB7
:0 - 4"	3 P-SM	Dk. brn silty sound w/ grows & Roots.
H"-10*	5 P	Brn-tan gravelly sand. Gravel is sub-angular to rounded. Rusty at top feding to tan dwnward. 1048518
10"-254	CL	Color tends to durken w/ depth.
End		5 YR 2.5/2
		-

SAMPLE	ATT	ERBERG	LMITS	UNI	T WEIGH	TS_	35	NE E	STRENGTH PARAMETERS				
DEPTH	LIQUID		PLASTICITY INDEX	WET	DRY	BOUNNIT	98	2005 2005	TYPE	UNCONFINED COMPRESSION	COMESION	PRICTION	STREES
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M-16													
23"													
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SAMPLE LOG

PROJECT NAME: Of the Good Date: G/30/84 PROJECT NO.: 3408.00

SAMPLE LOCATION: Nitro Pond-2 Gooded By: WFG SAMPLE NO.: NG-8

DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
:0 -24"	CL	Photo IB12 DK. brn, v. stiff clay. Thin streets of lighter color. Top 3" 19 grand root zone.
. Z O		
-		-

SAMPLE			LIMITS	UNIT WEIGHTS			¥. §		STREM	TH PARAME	TERS		
DEPTH		PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOUNNIT	SOUTE	PES PATUR	TYPE	COMPRESSION	CONESION	AMOLE	STRESS
m-27			·										·
20-14													
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ASSOCIATES SAMPLE LOG

PROJECT NAME: Olin Eco/ENV. DATE: 6/27/84 PROJECT NO.: 3408.98

SAMPLE LOCATION: Oleum Pond LOGGED BY: WFG SAMPLE NO.: OP-1

DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
		photo IA3
0-4"	ML	Gry moist, silt w/ roots. color /DR3/1 (moist) Strong organic/sulfur smell
4"- 12"	ML	Gry-brn silt w/some sand. Roots continue. Color grading lighter w/depth. color syr4/4
15"- 27"	ML	Brn. sandy silt low-plastre. Roots - fewer than above.
END		color 7.5 YR 4/6
	,-	
		•

SAMPLE			LMITS		T WEIGH	T3	25	¥. \$	STRENSTH PARAMETERS				
DEPTH	LIGUID	PLASTIC LIBITS	PLASTICITY INDEX	WET	9417	BOUWHIT		202	TOPE TEST	CONTACTOR FROOMANTS	CONTROL	AMOLE	STREET
•		3-20											
15"33"													

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PROJECT NO: 3408.7 SAMPLE LOCATION: OLEUM POND LOGGED BY: DEPTH SAMPLE CLASSIFICATION Sample OP-2 was retained but not logged due to low sample recovery. Sample OP-4 was take immediately adjacent to OP-2's location. Please refer to OP-4 for a representative sample description.		AYRES ASSOCIATES SAMPLE LOG	
DEPTH SAMPLE CLASSIFICATION Sample OP-2 was retained by not logged due to low sample recovery. Sample OP-4 was take immediately adjacent to OP-2's location. Please refer to OP-4 for	1 .		PROJECT NO.: 3408,98
not logged due to low sample recovery. Sample OP-4 was take immediately adjacent to OP-2's location. Please refer to OP-4 for			SAMPLE NO.
		not logged due recovery. Sample immediately adjacent location. Please r	to low sample OP-4 was taken it to OP-2's refer to OP-4 for

SAMPLE	ATT	ATTERBERG LIMITS			T WEIGH	TS	35	2.5		STREM	ITH PARAM		
DEPTH	LIMITS	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOVINIT	808	252	TYPE	COMPRESSION	CONESION	AMOLE	STRESS
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: Olin Eco/Env (ION: Olenn Pond (SAMPLE CLASSIFICATION	COGED BY: WFG SAMPLE NO.: 0P-3												
BAMBIE MARRIEMATICAL													
SAMPLE CLASSIFICATION	DESCRIPTION												
	· photo ICI2												
Mr (WH) ?	Gry, soft, clayer silt. Over saturated												
	in top 2", below sat. deeper. Much root												
	metrical top 3". # Bacomes docker group & stiffer @ 13" Organic or churical small a top. 2.5 4R 4/0												
ML	Lt. gray, 5 oft clayer siltnear saturation, Some dark mottles. 5 YR 6/2												
Porm 16"-21"													
	TEST RESULTS												
IERG LIMITS UNIT WEN	STRENGTH PARAMETERS												
	· ML												

SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	rs		PAT	STRENGTH PARAMETERS				
DEPTH	LIMITS	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOUNNIT	98	202	TYPE	COMPRESSION	CONTRICM	AMOLE	STRESS
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SAMPLE LOG

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06	PTH	8/	AMPLE CLA	SSIFICAT	ION				DESCRIP'	TION			
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0-:	54		ÖL	-		much	w	1 61	qan;	satur ics. De ingint	creating	satu	ination
5°-	31"		CL			Gry-	brn . B	, cl.	ay	54210 Firm a	f top	to v	stiff
Ent	2_				-		•						
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						•	۶	,5Lm	- 19-	-25"			
			······································			TES	T RE	SULT	S				
24401 5	ATT	ERRER	LIMITS	Lines	T WEIGH		35	8.8		STREN	STH PARAME	TERS	
DEPTH	Liene	PLASTIC LIMITS	PLASTICITY	WET	DET	THATOS	F802	202	TYPE	COMPRESSION	COMESION	PRICTION AMOLE	STREET
		_				7				<u> </u>	<u> </u>	1	

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10-13

AYRES

SAMPLE LOG

PROJECT NAME: Olin Ero/ ENV DATE: 7/1/84 SAMPLE LOCATION: Olevan Pond SAMPLE NO.: OP-5 SAMPLE CLASSIFICATION DESCRIPTION photo IB21 Tam, unitern fine sand. From 10-28" sand is moist to near saturation From 11-12" zone her soft silt and is gray - ton color. 12" -16" has trau silt. color 2.54 7/4 (fairly dry) END Perm 17"-22" (L-11)

SAM	PLE	ATTA	ERBERG	LIMITS	UNI	T WEIGH	TS	200	R. P. C.		STREM	TH PARAME		
067	TH	LIGURD	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOUWIT	909		TYPE	COMPRESSION	COMESION	AMOLE	STREET
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ASSOCIATES

SAMPLE LOG

PROJECT NAME: Olin Eco/ENV DATE: 6/26/84 SAMPLE NO.: OP- 6 SAMPLE LOCATION: Oleum Pond LOGGED BY WIFE DESCRIPTION DEPTH SAMPLE CLASSIFICATION Photo IAO . frimed. It. brn. sand. Roots to 5" 0-6" SP Layer of gry. clayery silt @ 5"-6" wy roots. 10 YR 6/3 for med , gel. - bon sond. SP 6'-7" End. 2.545/4 Note: No sample fraction remaining after chemical analysis. TEST RESULTS

SAMPLE	ATT	ERSEM	LMITS	UNI	T WEIGH	TS	35	¥.¥		STREM		TH PARAMETERS			
DEPTH	FIRMUS FIGURE	LIMITS	PLASTICITY MOEX	WET	987	SOVERT	8	202	THE	COMPRESSION	CHEMON	AMOLE	STREET		
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ASSOCIATES SAMPLE LOG

PROJECT NAME: Olim BAAP DATE: 6/28/84 PROJECT NO.: 3408.98

SAMPLE LOCATION: Oleum Pond: LOGGED BY: WFG SAMPLE NO.: OP-7

DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0-6"	CL	Stiff bm. soundy clay color SYR3/4
6 -18"	CL	Brn. Sandy clay w/ gravel.
END		tight Tan 1" zone of silly fine
		Sand near end. Some "gravel, few preser weathered angula 5 ndstn. Color 54R 3/3
		Photo IA4
	·	

SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	TS	35	1 2.5	STRENGTH PARAMETERS					
DEPTH	LIQUID	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOUNNIT	TROS	9000 9000 9000 9000 9000 9000 9000 900	TYPE	COMPRESSION	COMESION	PINCTION	STREES	
9-11"	55	-22			ŀ									
7-11"														
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PROJECT NAME	· O/m Eco/ Env	DATE: 7/3/84 PROJECT NO: 3408.000
SAMPLE LOCAT	non: Oleum Pond-Daire	COGGED BY: WFG SAMPLE NO.: OP-8
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0 - 12"=	M	photo IC10 Dk. brn. silt and sand. It some gravel. Roots to 6". At bottom of zone 13 an area of fine dk granular
12"-26"	ع ۵	material of guarte. Appears to be severly weathered dk. xtaline rock. Mw-covite mrca also present. 7.54R4/6
-		brn to ton, uniform, fine sand w/ some grav. Gravel is mostly in top 1/2 of interval. Sand color lightens downward, 10 'R 6/6 (moist) 10 YR 7/3 Ary
		Perm 20"-26"
		TEST RESULTS
SAMPLE ATTER	BERG LINETS UNIT WEN	GHTS 55 5 5 STRENGTH PARAMETERS

SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	TS	35	¥_\$		STREM	GTH PARAMI	ETERS	
	LIOURD		PLASTICITY IMPEX	WET	DRY	BOUMET	98	205	TYPE	COMPRESSION	COMESION	Anoug	STREES
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ASSOCIATES SAMPLE LOG

PROJECT I	NAME: O	in - Eco	ENV.	DATE:	June 27,	19 84	P	ROJECT	NO.:_	
				_						

SAMPLE LOCATION: Oleum Pond.	ChiaLOGGED BY:	UFG	SAMPLE	NO.: OP - 9

SAMPLE LOCAT	10N: <u>Cleum Pond - Union</u>	LOGGED BY: SAMPLE NO.: OP- 9
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0 - 7"	ML	Photo TAZ gir. Sand Brn., in silt w/ tr. grav. Stiff. Discard 0-1"-grav. Fr. roots thru zone- some durk mettles.
7"-29"	ML	Brn, v. stiff silt w/ tr. fn sand. I"x1" pocket
END		severely weathered xtalline rockat 9" depth,
		Single 1/" or root at 20"- 23". Crumbly when squeezed w/ fingers.
		Atterburgs 5-2 14"-15"
		color 5 YR 4/4
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i	SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGHT	rs		282		STREM	ITH PARAME		
	DEPTH	LIBITS LIBITS	PLASTIC LIMITS	PLASTICITY INDEX	WET	DATY	BOVINIT	98	305	TEST	COMMISSION	CONSTRUCT	AMOLE	STREET
	·4"-15"	Pas	S-2											
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PROJECT NAME	Olin Eco/ENV C	DATE: 7/2/84 PROJECT NO.: 3408.60
	101: Rocket Downeger	
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0 - 5"	5P .	photo IC23 Brn gravelly, fine sound. Frue roots through interval. 7.5 4R4/6
5"-33"	ML	Brn clayer silt w/ some fine soud. Tr gravel. Top 2" enriched in f. soud. At 13" is pocket of broken, angular grav.
22 ⁻² -26'	3 P	10 4R4/4 Brn. med. Sand w/ some cs & f sand. A few clumps of silt/clay curriched sand.
Ę <u>nd</u>		7.5 YR4/6
		TEST RESULTS

SAMPLE	ATT	ERBERG	LIMITS	UNI	T WEIGH	TS	35	4.5	STRENGTH PARAMETERS					
DEPTH	LIQUID LIMITS	PLASTIC LIMITS	PLASTICITY INDEX	WE?	DRY	BOUWART	200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E 200 E	PESSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE PERSON SECURITY OF THE	TYPE	UNCONFINED COMPRESSION	COMESION	AMPLE	STRESS	
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ASSOCIATES SAMPLE LOG

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photo ID 0 Brn Silt w/ truf and and gravel. 10 PR 3/3 Silty fine sand and same gravel. Growlin rounded and not weathered. 10 PR 5/4 END TEST RESULTS THE THEREOR LIMITS UNIT WEIGHTS THE I WEIGHTE IN HEADER IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE PROPERTY IN THE P				_				F6			SAMPLE NO.:	RAD-	2	
Brn Silt w/ truf sand and gravel. 3"-15" SM Silty fine sand and some gravel. Granding rounded and not weathered. 10 YR 5/4 END TEST RESULTS STRENGTH PARAMETERS THE LUCOSTATE IN ACCOUNTS WHITE LUCOSTATE IN ACCOUNTS THE LUCOSTATE IN ACCOUNTS	DE	PTH	SAMPLE CLA	SSIFICATIO	N				DESCRIP	TION	· .			
Silty fine sound and some gravel. Granding rounded and not weathered. 104R 5/4 END TEST RESULTS MARKE ATTERBERG LANTS UNIT WEIGHTS STRENGTH MARAMETERS FRETT LOSIO IN APPENDED IN MERCHANDE PROGRAMMENT IN THE MERCHAND IN PROGRAMMENT IN THE MERCHAND IN PROGRAMMENT IN THE MERCHAND IN PROGRAMMENT IN THE MERCHAND IN PROGRAMMENT IN THE MERCHAND IN PROGRAMMENT IN THE MERCHAND IN PROGRAMMENT IN THE MERCHAND IN PROGRAMMENT IN THE MERCHAND IN PROGRAMMENT IN THE MERCHAND IN PROGRAMMENT IN THE MERCHAND IN PROGRAMMENT IN THE MERCHAND IN PROGRAMMENT IN THE MERCHAND IN PROGRAMMENT IN THE MERCHAND IN PROGRAMMENT IN THE MERCHAND IN THE MERCHAND IN PROGRAMMENT IN THE MERCHAND IN PROGRAMMENT IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAND IN THE MERCHAN		•			۶	shoto.	T 1	ם מ	•					
Growling rounded and not weathered. 1048 5/4 TEST RESULTS STRENGTH MARAMETERS THE UNION IN ACTION OF PROPERTY OF THE UNION OF THE PROPERTY.	0-	3"	ML			10 9	S:11 R 3/	Γ ω _/ 3	tr.	of. sand	<u></u> d 9	ravel.		
TEST RESULTS PAMPLE ATTERBERS LIMITS UNIT WEIGHTS STRENGTH MACAMETERS THE STRENGTH MACAMETERS THE UNCONFINED CONTROL OF STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH PROCESSING STRENGTH STRENGTH STRENGTH STRENGTH STRENGTH STRENGTH STRENGTH STRENGTH STRENGTH STRENGTH STRENGTH STRE	3"-)	15 ⁴	SM			Grove	is	rou	som Lded	d and no	some g + weeth	ravel hered		
SAMPLE ATTERBERG LIMITS UNIT WEIGHTS STRENGTH PARAMETERS	ENC	2	-			TES	TRE							
DESTIN LIQUID IN ASTIC PLASTICITY						I WE I WILL								
	Sample Depth						Series Series	205	TYPE	I UNCONFINED			STREETINE STREET	

SAMPLE	ATTERBERG LIMITS			UNIT WEIGHTS			55	305	STRENGTH PARAMETERS					
DEPTH	LIQUID	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOUNNIT	PEOST!		TYPE	COMPRESSION	CONESION	AMOLE	STREETING STREETING	
											•		·	
C-17		Non- Plast												
12-15		runsi.												
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SAMPLE LOG

PROJECT NAME: Olin Eco/ENV DATE: 7/2/84 PROJECT NO: 3708.00

SAMPLE LOCATION: Rocket Drainesecosed BY: WFG SAMPLE NO.: RAD-3

SAMPLE LOCAT	JOH: KOCKET THE JUNESPE	CORGED BY: WE'S SAMPLE NO.: RECO-1
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
		· photo IC 13
p-5"	ML	Dk. gry - Brn, gravelly, silt. Some fore roots. 542.5/2
2"-26"	CL	Olu. gry - brn., mottled, soft silty clay. Moderately plastic Severely weathered rock @ 26". 544/2
END		
		Perm 15"-21"

SAMPLE	ATTERBERG LIMITS			UNIT WEIGHTS				RE.	STRENGTH PARAMETERS				
DEPTH	FIRMUS FIGNIS	PLASTIC LIMITS	PLASTICITY HIDEX	WET	DRY	BOUNNIT	808	202	TYPE	UNCONFINED COMPRESSION	CONESION	AMOLE	STRESS
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5-94										·			
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21-24		•											
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ASSOCIATES

SAMPLE LOG
PROJECT NAME: 01th Eco/Env Date: 7/2/84

PROJECT NO: 3408.00

SAMPLE LOCATION: Dec LOSSED BY: WFG SAMPLE NO.: RAD-Y

	SAMPLE LOCATI	ON: 162E	LOSSED BY: WF G	SAMPLE NO.: IX FF12-1					
•	DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION						
	0 -12"	E L	photo IC28 Dk. brown smaly s:1t. fine gravel. Roots ma 542.5/1						
	D-15"	ML	Brn. fine-ned sand and dk bands 1/2-1/2" this	-d s; It. Vague.					
	16"- 28" -	CL	Gry silty clay. Stron mutiled by bis gramler and vertical. 3 containing some sand 15"-17" in one side of 104R 5/2	s blk & rusty spots eem. Blk zone					
	END		-						

SAMPLE	ATTERBERG LIMITS			UNIT WEIGHTS			35			STRENGTH PARAMETERS				
DEPTH	LIMITS	PLASTIC LABITS	PLASTICITY MOEX	WET	DAY	BOUNNIT	98	202	TEST	CONFRESSION	CONESION	Anole	STREET NE	
C-14			-							·				
27-26		·										·		

SAMPLE LOG

	· Olin Eco/ENV	
	10in: Rocket Drainage	
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0-9"	SM	photo IC26 Dk. brn silty fine soud. w/ roots of plant matter. 10.4R3/2
9"-15"	ML	Brn. soudy silt wy light & Dark mottles. Tr of cs soud and fine gravel. Some roots
15"-28"	Sm .	brn silty fine sondw/tr. grav. 104R5/4
	<u>.</u>	Porm 4"-9"

j	SAMPLE	E ATTERBERS LIMITS			UNI	T WEIGH	TS		7.5		STREM	TH PARAME		
1	DEPTH	LIGHTS	PLASTIC LIMITS	PLASTICITY MOEX	WET	DRY	BOUNNIT	1800 1800	1000 1000	TEST	COMPRESSION	CONESION	Anole	STREES
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1	_													
	C-12													
4	10-15													
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yer in	-	
0-10"	5m	photo IC24 Dk brn Silfy, Sand w/ gravel in bottom 2" of interval. A few frue roots and one 8-4 woody root. 542.5/2
10"-17"	ML	Mottled gry & bon clayer silt. Some graved in lower 2". 12" & 1," roots. 544/2 - 104R5/1
T" - 29"	Sm	Brn silty sand w/ some gravelupto 2". 2.5 45/4
		TEST RESULTS

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SAMPLE	ATT	ERDEM	LIMITS	UN	UNIT WEIGHTS			# Z	STRENGTH PARAMETERS							
DEPTH	LIBERTS		PLASTICITY INDEX	WET	DATY	BOUWART	8	205	TYPE	COMPRESSION	CONESCON	PROCTION AMOUR	STRESS			
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5-7"			•									! · !				
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SAMPLE LOG

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	•			Parket				•	WF	<u></u>		BAMPLE NO.:				
1	DEP			MPLE CLA				المنطقية مستوري		DESCRIPT	TION					
	•						photo	·I	D			\				
	: :	4 "		· .	CL	1	Brn & Dk brn, stiff - v. stiff clay on silt. Top 3" show layering (-1/3"). Rem had marbling & irregular swirls of dk bro & lighter silty clay. Some fine and on									
	H-20	•		SM			k" do	" &c	"cark -wel	bon" g	granules. 12" and w, 5 YR4/4	in botto	m 3" 3/2 -	' .		
	æ->	L6"		ML							5 YR4/4 0/ some e 0/gan			?ne		
							-									
							TES	T RE	SULT	'S						
	SAMPLE			LMITS	UNIT	T WEIGH	ITS	3 5	# # # #			STH PARAME				
			PLASTIC LIMITS	PLASTICITY HIDEX	WET	DRY	BOVINIT	CONTRA	385	TYPE	COMPRESSION	COMESHOR	Anols	STIME SO		
	C-21 7-10		. J										·	·		



SAMPLE LOG

PROJECT NAME: Olin Eco ENV DATE: 7/3/84 PROJECT NO.: 3408.00

SAMPLE LOCATION: Rocket Drainage LOSSED BY: WFG SAMPLE NO.: PAD-8

DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
o- 6 [.] "	ML	photo ID5 Dk bra silt w/ fine soud. Some Roots. 104R2/1
6-9"	se	Brn med. Sand 54R3/4
9."-14"	m L	Lt. & Dk brn silty for sand. Sand Streeks are It. Drn., silty areas on danker. Some lay ering. Silt fraction increasing downward. 4" root e 10".
14-20"	CL	54R3/2 Olv. brn, Stiff Silty clay, some Line blk granulus (carbon?) 104R4/3
20"-28"	5 <u>m</u> -s⊂	Brn clayey, silty soul, Tr. gravel. 5 YR3/4
End	-	Perm 22"27"

SAMPLE	E ATTERBERG LIMITS			UNI	T WEIGH	TS		7.5		STREM	STH PARAME		
DEPTH		PLASTIC LIGHTS	PLASTICITY MOEX	WET	DAY	BOVINIT	98	865	TYPE	UNCONFUED COMPRESSION	COMESION	PRICTION	STREET NE
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C-22													
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17-19		•											
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SAMPLE LOG

PROJECT NAME: Olin Foo | ENV DATE: 7/2/84 PROJECT NO.: 3408.00

SAMPLE LOCATION: Docket Dreinage, LOSSED BY: UFC SAMPLE NO.: RAD-9

DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0-13"	ML	Photo Ic30 Brn. silt w/ some soud, Tr. gravel, Abundant roots up to '2" dia. Striktly lighter color toward bottom indicates transition to next layer. 104R3/3
13-23" END	SM	It. brn f. sond w/ some silt. and tr lg gravel. At 16" \$22" is a 14" layer of fine sond size black granules in association w/ gold color metallic appearing grains also f. sand size. Some gold grains one plates of some seem blocky. Platy grains strongly resemble muscovite mice. Between 16" \$20" are scattered thim layers of blk silty natural. 7.54R4/4

SAMPLE	E ATTERBERS LIMITS			UNIT WEIGHTS				# . E		STREM	TH PARAME		
DEPTH	LIMITS	PLASTIC LIBITS	PLASTICITY MOEX	WET	DRY	BOUNNIT	UTBOS UTBOS	202	TEST	COMPRESSION	COMESION	ANOLE	STREET
ما1- ع													
9-12"													
		·											

SAMPLE LOG

PROJECT NO.: 2408.00 PROJECT NAME: Olin Eco/ENU DATE: 7/2/84 SAMPLE LOCATION: Pocket Drainage LOGGED BY: WFG SAMPLE NO .: RAD-10 SAMPLE CLASSIFICATION photo IC19 Brn silt & fine sand. Fine roots to 9" ML 54R4/4 Alternating zones of soundy silt & silty SM Sound. Dh. s/v. brown. Soudy silt zones have dk mottles and a wavy, marbled appearance. 54R3/4 23"-27" Yellowish-tra uniform fine sound w/ SM Some sit 1/4" blk and size material @ 35" (non-magnétic) Carlson? 10 YR 5/6 TEST RESULTS STRENGTH PARAMETERS UNIT WEIGHTS ATTERBERG LIMITS BOURNIT c-6

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			DIME								PROJECT NO.		
SAMP	LE LO	CATION:	Rocket	Drain	معدده	GGED BY:		SE	<u>. </u>		SAMPLE NO.	RAI	0-11
30	PTH	5/	MPLE CLA	SSIFICAT	TION				DESCRIP	TION			
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11-2	ഥ"		Mı	_		bude 7. Blk s in b	silf	1/4 . ci	hu um!	sund bly, Tur Top ~	and its ining to 2" consider	dark	brn thru
20.	2 9'	La .	ML	-		11 @ 17 Brn. 25h	: 17. ' 100 7". ' 50. " /	f+ f+ tub	day day this	twig 1/2/0 ey 5:1+ inter nentye	b-vertice or root Dark J was 3 3 - 2.5 I water	al and is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is how is	d are i = antal bottom d out struded.
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SAMPLE		ERBER		UNI	T WEIGH	ITS .	CONTENT	SECRET SECRET			GTH PARAME		
DEPTH	LIMITS	LIMITS	PLASTICITY	WET	DRY	BOUNNIT	8	8 3	TYPE	COMPRESSION	CONESION	Amous	STRESS
۷7 23-21													·

SAMPLE LOG

	A.1 I-	SAMPLE LOG
	: Olim Eco/Env	DATE: 7/2/84 PROJECT NO.: 3408,00
		LOGGED BY: WFG SAMPLE NO.: RAD-12
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0 - 84	ML	photo: I C18 Bra Soundy silt w/ I am blk mothles.
•		Mottes. of rocker bra w/ light coloned mottes. of rocks. 5-8" is blk w/ light mottles a is crumbly, also tends to/===/
g"- <u>3</u> 8"	Sm	Irecture - horizontally. 1048/7, (2.542/0) Dk. brafizma & silt. From 13-16"
		is severly weathered rock but still contains some hard fragments. 104R3/4
		Perm 16"-21"
	l	
ĺ		TEST RESULTS

SAMPLE	LE ATTERBERG LIMITS			UNI	T WEIGH	TS		1 2 2	<u> </u>	STREM	STH PARAME	TERS	
DEPTH	LIMITS	PLASTIC LIBITS	PLASTICITY IMDEX	WET	ORY	THANCOR	CONTEN	202	TYPE	COMPRESSION	COMESTON	AMOLE	STREETING STRESS
									j				
6-5											!		
9-13												·	

SAMPLE LOG ROJECT NAME: Olin Eco / ENV DATE: 7/2/84 - PROJECT NO: 3408.00 SAMPLE LOCATION: Rocket Drainese LOSSED BY: WF & SAMPLE NO .: RAD-13 SAMPLE CLASSIFICATION DESCRIPTION Photo IC17 0-2"= Brn. Silty fine sound w/tr. gravel. SP-SM Some fine Roots. 104R 3/3 Tam silty frue sand. Silt tends to 5 P - SM occiur in clumps which do not contain much sand. 104R 6/4 & 10 4R 4/4 (s: It clups) B"-294 Brn. silty fine sand, 1/2" Silty layer . SP- 5M @ ~ 22". The primary difference between 2"-12" { 13"-99" is one of color. END 10 YR 4/6 TEST RESULTS ATTERBERG LIMITS UNIT WEIGHTS STRENGTH PARAMETERS UNCONFINED BOUNNET Non-PLAST.

AYRES ASSOCIATES SAMPLE LOG

PROJECT NAME: Din Eco/EAV DATE: 7/2/84 PROJECT NO.: 3408.00

SAMPLE LOCATION: Rocket Drainings Logged By: WFC- SAMPLE NO.: RAD-14

CONTRACT COOK	1011-23-23-3	SAMPLE RO. 12/10-11
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
0-12"	SM	Brn. silty fine sand w/ roots 104R4/4
p"-28"	SM	Pellowish- 5rn uniform fine Sand, Decurring in afternating layers w/ brn 5: It. Silt layers < 1" thick except bottom 3" which is one 5: It zone composed of multiple 1/6- 3/6" layers Zone splits on layer hedding. Layers contain v.f. Sand. 10 YR 5/8
End		·

PLE					T WEIGH	TS		MEE PAAT.		STREM	TH PARAME	TERS	
TH _	LIGUID	PLASTIC LIMITS	PLASTICITY	WET	DRY	BOURNIT	NOOSTUR CONTEN		TYPE	COMPRESSION	CONESION	PRICTION	STRESS
\mathbf{N}		Non-											
II		PLAST											
11													
H											ا		

						SAN	MPL	EL	OG.					
PROJ	ECT NA	ME: _C	Iku E	ENV ENV						f	PROJECT NO.	3408	00	
				+ Draine							SAMPLE NO.:	_		
DE	PTH	S	IMPLE CLA	SSIFICATIO	N				DESCRIP	TION			*	
0-	6 "		5/	M _	1'			sil		Cine 3a	~d.			
6"-:	27"	'	5 M	1						fine s			_	
					1	silt. Most silt is in layers up to								
					1	12" thick which are concentrated in								
					1	'Nte	rval	۱. 14	''-19	7",	7.5 YR	5/8		
							•							
		7				•	ı	•	. " _	· _ #				
						1	rm	20) - 8	15"	<u></u>			
						TES		SULT	S	_				
SAMPLE DEPTH			PLASTICITY	T	STRENGTH PARAMETERS DRY SOUTHIT 28 2 2 TYPE UNCONFINED COMESION COMESION AMOLE STRESS									
	LIMITS	LIMITS	INOEX	WET	DUA I	TIMENO	88	5 5	TEST	COMPRESSION	-	AMOLE	STRESS	
					j									
C-8		Non-												
10-14		PLAST.										·		



SAMPLE LOG

PROJECT NAME: Olin Eco/ENU DATE: 7/2/84 PROJECT NO: 3408.00

SAMPLE LOCATION: Rocket Drainegeogged By: WFG SAMPLE NO: RAD-16

DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
o-6"	SM .	photo IC25 Brn. silty sand w/roots. (Topsoil, Lean) 10 4R 3/2
6- 15"	Sm	Ton silty uniform fine some of From 12"-15" soil is in discs ~1" thick which are
15" - 28"	5m	Brn. Soudy silt in 1"to 2" discs. Soud fraction is very uniform. 545/4
98"- 30 "	5P	Light Ton clean fine sound. 10 YR 7/4
END		

SAMPLE	ATTERBERG LIMITS UNIT WEIGHTS				TS		1 2 2	!	STREM	OTH PARAME	TERS		
DEPTH	LIMITS	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOUWANT	SOSTI TESS	2 2 2	TEST	COMPRESSION	COMEDICAL	PRICTION	STRESS
							•		1				.
	İ		·										
	l	/15h -										,	
		plant	K				1						
	ł				l			[l

SAMPLE LOG

PROJECT NAME: Alin Eco/ENU DATE: 7/2/84 PROJECT NO: 3408.00

SAMPLE LOCATION: Rocket Drainage LOGGED BY: WFG SAMPLE NO.:RAD-17

DEPTH SAMPLE CLASSIFICATION DESCRIPTION

Photo IC 27

Silty, bro., fine soud. (moist) Some fine
roots. A few small, discontinuous
silty zones. 54R4/4

Dk. brown fine soud w/ more silt than
above interval. Approx 30-45% silt.
Darker mottles are present. Bottom 2"
Show v. thin soudy I enems. 104R3/2

Brn. uniform fine soud. Top 4"

Brn. uniform frue sand. Top 4"
has dark brn grunty colored zones and
lenses.
10 9R 6/6

	SAMPLE ATTERBERG LIMITS				UNI	T WEIGH	rs	55	S. E.		STREM	TH PARAME		EPPEDINE STREES			
_	DEPTH	LIGUED	PLASTIC LIMITS	PLASTICITY IMDEX	WET	DRY	BOUNNIT	CONTE	1000 1000 1000 1000	TOPE	COMPRESSION	CONESION	AMOLE	STREES			
1																	
=																	
•	C-13			·													
1	n 4		Non-														
	10-13		PLAST.								•						
1																	

SAMPLE LOG

PROJECT NAME: 01: DATE: 6/20/84 PROJECT NO.: 3408 60

SAMPLE LOCATION: Rocket Drainage LOSSED BY: UF G SAMPLE NO.: RAD-18

SAMPLE LOCAT	ON: CAESAL DESIGNADE	CONSED BY: SAMPLE NO.:
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
		photo ID17
[0 - 3"	ML:	Brn. silt w/ some v.f. somd.
3"=17"±	SM	Yellowish-tan v.f. unitarm sandw/sand silt. 2.575/6
17." -'27"	SP	Tan v.f. uniform sand. 104R6/6
END	,	
		Perm @ 21-27"

SAMPLE	ATT	ATTERBERG LIMITS UNIT WEIGHTS				TS		7 2		STREM	STH PARAME			l
DEPTH		PLASTIC LIMITS	PLASTICITY INDEX	WET	DAY	BOUWNIT	MOISTU CONTE	PESR SATUR	TEST	COMPRESSION	CONESION	ANOLE	STRESS	
														l
							İ ,					} ;		ĺ
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		Non-t	beste											
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SAMPLE LOG

PROJECT NAME: Olin ECO/ENV DATE: 7-1-84 PROJECT NO: 3408.00

<u>l</u>	SAMPLE LOCATI	ion: <u>Cocket Area Ur</u> i	COSSED BY: PSW SAMPLE NO.: RAU-17
1	DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
	.0-9"	Muck (OL)	Photo IC8 Muck, dark gray (), silty, soft, saturated, with roots and fibers, strong organic smell
	9-18"	OL	Silt, dork gray (), with organics, roots, strong organic smell, wet, firm, trace small subrounded gravel; blocky structure
][
			No Atterbera sample
			Perm sample 13-18"

SAMPLE	ATTERBERG LIMITS			UNIT WEIGHTS			TE SE	E E	STRENGTH PARAMETERS					
HTES	LIMITS	PLASTIC LIMITS	PLASTICITY INDEX	WET	DAY	BOUWART	1900 1909		TEST	UNCONFINED COMPRESSION	CONESION	PRICTION AROLE	STREET	
													·	
4			, ,											
											i			
İ)										

ASSOCIATES

SAMPLE LOG

PROJECT NAME: Olin Eco/Enix Date: 6/30/84 PROJECT NO.: 3408.00

SAMPLE LOCATION: Rocket Drainge & LOGGED BY: WFC SAMPLE NO.: RAD - 20

		SMIPLE NU. 1271
DEPTH	SAMPLE CLASSIFICATION	DESCRIPTION
		Photo. IBC
Ø-3-#	m∟	Brn topsoil w/roots. Silt
3" - 8"±	5 M	Bra zilly fine sand. w/roots 104R3/2
8" <u>-</u> 30"	42	Brn to tan uniform 1.
END	· -	2.576/4

SAMPLE	SAMPLE ATTERBERG LIMITS			UNI	T WEIGH	rs	FTURE	P. R.		STREM	TH PARAME		
DEPTH	MINIS LIGHID	PLASTIC LIMITS	PLASTICITY INDEX	WET	DRY	BOUWART	100	202	TYPE	COMPRESSION	CONCRION	PRICTION ANGLE	STRESS
													. [
		non- Dladi											
		1 12 100											
													·
										l			

BORING LOGS

Boring Description	Contractor	Date Installed
Background Wells		
BGM-91-01	ABB-ES	10/28/91
BGM-91-01X	ABB-ES	10/27/91
BGM-91-02	ABB-ES	11/6/91
BGM-91-03	ABB-ES	11/7/91
Propellant Burning Ground		
PBB-91-01	ABB-ES	10/12/91
PBB-91-02	ABB-ES	10/12/91
PBB-91-03	ABB-ES	10/12/91
PBB-91-04	ABB-ES	10/14/91
PBB-91-05	ABB-ES	10/15/91
PBB-91-06	ABB-ES	10/13/91
PBB-91-07	ABB-ES	10/13/91
PBB-90-01	ABB-ES	8/23/90
PBB-90-02	ABB-ES	8/23/90
PBB-89-01	ABB-ES	1/23/89
PBB-89-02	ABB-ES	1/25/89
PBB-89-03	ABB-ES	2/1/89
PBB-89-04	ABB-ES	2/6/89
PBB-89-05	ABB-ES	2/13/89
PBB-89-06	ABB-ES	2/14/89
PBB-89-07	ABB-ES	2/17/89
PBB-89-10	ABB-ES	1/19/89
PBB-82-01	Warzyn	2/18/82
PBB-82-02 PBB-82-03	Warzyn	2/22/82 2/18/82
PBB-82-04	Warzyn Warzyn	2/16/82 2/22/82
PBB-82-05	Warzyn Warzyn	2/22/82
PBB-82-06		2/16/82
PBB-82-07	Warzyn Warzyn	2/16/82
PBB-82-08	Warzyn	2/10/82
PBP-91-01	ABB-ES	10/13/91
PBP-91-02	ABB-ES	10/13/91
PBN-91-06C	ABB-ES	10/22/91
PBN-91-06D	ABB-ES	10/12/91
PBN-91-12C	ABB-ES	10/23/91
PBN-91-12D	ABB-ES	10/16/91
PBN-89-01D	ABB-ES	1/20/89
PBN-89-02C	ABB-ES	3/19/89
PBN-89-04C	ABB-ES	4/16/89
PBM-89-05	ABB-ES	3/3/89
PBM-89-07	ABB-ES	3/3/89
PBM-89-09	ABB-ES	3/1/89
PBN-89-10D	ABB-ES	3/7/89
		-1.102

PBM-89-11	ABB-ES	3/7/89
PBN-89-12B	ABB-ES	4/15/89
PBM-85-01	AEHA	9/22/85
PBM-85-02	AEHA	9/17/85
PBM-85-03	AEHA	9/18/85
PBM-85-04	AEHA	9/24/85
PBM-85-05	AEHA	9/28/85
PBM-85-06	AEHA	10/4/85
PBN-85-01A	AEHA	9/15/85
PBN-85-02A	AEHA	10/1/85
PBN-85-03A	AEHA	10/3/85
PBN-85-04A	AEHA	9/30/85
PBM-82-01		3/18/82
	Warzyn	
PBM-82-02	Warzyn	3/17/82
PBM-82-03	Warzyn	3/16/82
PBM-82-04	Warzyn	3/16/82
PBM-82-05	Warzyn	3/17/82
PBN-82-01A	Warzyn	3/18/82
PBN-82-01B	Warzyn	3/10/82
PBN-82-01C	Warzyn	3/9/82
PBN-82-02A	Warzyn	5/1/82
PBN-82-02B	Warzyn	3/8/82
PBN-82-02C	Warzyn	3/9/82
PBN-82-03A	Warzyn	3/15/82
PBN-82-03B	Warzyn	3/15/82
PBN-82-03C	Warzyn	3/13/82
PBN-82-04A	Warzyn	3/12/82
PBN-82-04B	Warzyn	3/13/82
PBN-82-04C	Warzyn	3/11/82
PBN-82-05A	Warzyn	3/13/82
PBN-82-05B	Warzyn	3/11/82
PBN-82-05C	Warzyn	3/11/82
		-,,
Landfill 1	•	
LOB-90-01	ABB-ES	8/21/90
LOB-90-02	ABB-ES	8/21/90
LOM-91-01	ABB-ES	10/10/91
LOM-91-02	ABB-ES	10/25/91
LOM-89-01	ABB-ES	2/17/89
LON-89-02B	ABB-ES	2/18/89
LON-89-03B	ABB-ES	2/20/89
Cottling Donds and		
Settling Ponds and		
Spoils Disposal Area		
SPB-91-01	ABB-ES	10/14/91
SPN-91-02D	ABB-ES	10/9/91
SPN-91-02D SPN-91-03D	ABB-ES	10/8/91
SPN-91-03D SPN-91-04D	ABB-ES	10/2/91
	ABB-ES	3/29/89
SPN-89-01C		
SPN-89-02C	ABB-ES	4/14/89
SPN-89-03C	ABB-ES	4/13/89
SPN-89-04C	ABB-ES	3/30/89

Deterrent Burning Ground

DDD 04 04	100 00	
DBB-91-01	ABB-ES	10/15/91
DBB-91-02	ABB-ES	10/16/91
DBB-91-03	ABB-ES	10/16/91
DBB-89-01 .	ABB-ES	1/20/89
DBB-89-02	ABB-ES	1/11/89
DBB-89-03	ABB-ES	1/9/89
DBB-82-01	Warzyn	3/11/82
DBB-82-02	Warzyn	3/10/82
DBB-82-03	Warzyn	2/24/82
DBB-82-04	Warzyn	3/9/82
DBN-89-02B	ABB-ES	2/2/89
DBN-89-04B	ABB-ES	2/7/89
DBM-82-01	Warzyn	3/22/82
DBM-82-02	Warzyn	3/19/82
DBN-82-01B	Warzyn	3/23/82
DBN-82-01C	Warzyn	3/22/82

Existing Landfill

ELB-82-01	Warzyn	3/12/82
ELB-82-02	Warzyn	3/15/82
ELB-82-03	Warzyn	3/11/82
ELB-82-04	Warzyn	2/23/82
ELB-82-05	Warzyn	2/23/82
ELB-82-06	Warzyn	3/17/82
ELN-91-07A	ABB-ES	11/10/91
ELN-91-07B	ABB-ES	11/9/91
ELM-91-10	ABB-ES	11/13/91
ELN-89-02A	ABB-ES	1/24/89
ELM-89-03	ABB-ES	1/25/89
ELM-89-05	ABB-ES	2/1/89
ELM-89-07	ABB-ES	4/18/89
ELM-89-08	ABB-ES	4/1/89
ELM-89-09	ABB-ES	4/13/89
ELN-82-01A	Warzyn	3/29/82
ELN-82-01B	Warzyn	3/30/82
ELN-82-01C	Warzyn	3/29/82
ELN-82-02A	Warzyn	4/1/82
ELN-82-02B	Warzyn	4/1/82
ELN-82-02C	Warzyn	4/2/82
ELN-82-03A	Warzyn	3/24/82
ELN-82-03B	Warzyn	3/25/82
ELN-82-03C	Warzyn	3/24/82
ELN-82-04A	Warzyn	3/26/82
ELN-82-04B	Warzyn	3/26/82
ELN-82-04C	Warzyn	3/25/82
	_	•

Rocket	Paste	Area
Nitrogl	ycerin	e Pond

NPM-89-01	ABB-ES	10/25/89
RPM-91-01	ABB-ES	10/25/91
RPM-89-01	ABB-ES	10/16/89
RPM-89-02	ABB-ES	10/13/89
New Acid Area		
NAN-81-01A	Olin	1981
NAM-81-02B	Olin	1981
NAN-81-03B	Olin	1981
NAN-81-04B	Olin	1981
Oleum Plant and Pond		
OPB-91-01	ABB-ES	10/29/91
OPB-91-02	ABB-ES	10/10/91
OPB-91-03	ABB-ES	10/10/91
OPB-91-04	ABB-ES	10/11/91
OPB-91-05	ABB-ES	10/11/91
OPB-91-06	ABB-ES	10/23/91
OPB-91-07	ABB-ES	10/23/91
OPB-91-08	ABB-ES	10/23/91
OPB-91-09	ABB-ES	10/23/91
OPB-91-10	ABB-ES	10/23/91
OPB-91-11	ABB-ES	10/23/91
OPB-91-12	ABB-ES	10/23/91
OPB-91-13	ABB-ES	10/23/91
OPB-89-01	ABB-ES	11/13/89
OPB-89-02	ABB-ES	10/14/89
OPB-89-03	ABB-ES	10/12/89
OPB-89-04	ABB-ES	10/13/89
OPB-89-05	ABB-ES	10/10/89
OPB-89-06	ABB-ES	10/26/89
OPB-89-07	ABB-ES	10/25/89
OPB-89-08	ABB-ES	10/26/89
OPB-89-10	ABB-ES	10/26/89
OPB-89-11	ABB-ES	10/26/89
OPB-89-12	ABB-ES	10/25/89
OPB-89-13	ABB-ES	10/26/89
OPM-89-01	ABB-ES	11/13/89
OPM-89-02	ABB-ES	10/27/89
OPM-89-03	ABB-ES	11/11/89
Old Acid Area		
OAB-91-01	ABB-ES	10/9/91
OAB-91-02	ABB-ES	10/9/91
OAB-91-03	ABB-ES	10/16/91
OAB-89-01	ABB-ES	10/17/89
OAB-89-02	ABB-ES	10/24/89
OAB-89-03	ABB-ES	10/17/89

OAM-91-01	ABB-ES	10/27/91
Old Fuel Oil Tank		
FTB-91-01	ABB-ES	10/22/91
FTB-91-02	ABB-ES	10/22/91
FTB-89-01	ABB-ES	10/24/89
	Olin	• •
PHM-91-01	Olin	6/6/91
B-1	Olin	6/5/91
B-2	Olin	6/5/91
B-3		6/6/91
B-4	Olin	6/7/91
Off-Post (South)		
PBN-91-01C	ABB-ES	10/24/91
PBN-91-02B	ABB-ES	9/28/91
PBN-91-02C	ABB-ES	9/30/91
PBN-91-03B	ABB-ES	9/26/91
PBN-91-03C	ABB-ES	9/27/91
PBM-90-01D	ABB-ES	8/24/90
PBM-90-02D	ABB-ES	8/19/90
PBM-90-03D	ABB-ES	8/16/90
PBN-90-04B	ABB-ES	8/6/90
PBN-90-04D	ABB-ES	8/5/90
SWN-91-01B	ABB-ES	10/15/91
SWN-91-01C	ABB-ES	10/16/91
SWN-91-01D	ABB-ES	10/14/91
SWN-91-02C	ABB-ES	10/22/91
SWN-91-03B	ABB-ES	10/8/91
SWN-91-03C	ABB-ES	10/2/91
SWN-91-03D	ABB-ES	10/1/91
SWN-91-03E	ABB-ES	11/10/91
SWN-91-03X	ABB-ES	11/7/91
SWN-91-04C	ABB-ES	10/13/91
SWN-91-04D	ABB-ES	10/9/91
SWN-91-05B	ABB-ES	10/12/91
SWN-91-05C	ABB-ES	10/12/91
SWN-91-05D	ABB-ES	10/10/91
Base-wide		
S1101	Warzyn	12/13/79
S1103	Warzyn	11/2/79
S1106	Warzyn	11/14/79
S1107	Warzyn	1/10/80
S1108	Warzyn	12/29/80
S1109	Warzyn	2/14/80
S1110	Warzyn	1/15/80
\$1111	Warzyn	1/2/80
S1112	Warzyn	1/4/80
S1114	Warzyn	11/20/79
S1116	Warzyn	12/11/79
S1117	Warzyn	2/13/80
	_	

S1118	Warzyn	11/30/79
S1119	Warzyn	1/22/80
S1120	Warzyn	1/17/80
S1121	Warzyn	1/18/80
S1122	Warzyn	1/25/80
S1123	Warzyn	12/28/80
S1124	Warzyn	12/19/79
S1125	Warzyn	
S1126	Warzyn	2/11/80
S1127	Warzyn	2/8/80
S1128	Warzyn	12/19/79
S1129	Warzyn	2/7/80
S1131	Warzyn	12/6/79
S1132	Warzyn	2/4/80
S1147	Warzyn	1983
S1148	Warzyn	1983
S1149	Warzyn	1983
S1150	Warzyn	1983
S1151	Warzyn	1983
S1152A	Warzyn	9/26/85
S1152B	Warzyn	9/24/85
S1153	Warzyn	9/19/85

FI	ELD BORING	LOG	Boring No. Bum- 41-01			
Project No.06953-03	Project Name BADGER	AAP	Page _ _ ot			
Contractor LAYNE Driver G. RODANUS & Date started 10-28-91 completed 10-28-91						
MARIOR POWE MAIL	Casing Size 9" 0,15.	HNU 11.7/10.2	rotection Level 5			
Ground El	Soil Drilled 78'	4 below ground 64.5 To	otal Depth 78'			
Logged by 12/02	Checked by DRP	Date 10/30/91				
			78			

Sample	Depth in	Blows per	Pen Rec	Description	Comments on	Mo	onite	orang
No	Feet	6 inches	Hec		Advance of Boring	HI		LEL
5-1	0-10			BROWN CLAYEY SILT, R.D., TR F SAND, CONESIVE, AUSTI DAMP.		TAR	AIR	0
8-2	10-20	-///		LT BROWN - RUD SUTY SAN WED, C. SOME M. SOME F GRAVEL.	ANALYTICAL SAMPLES	0	0	C
Sport # 1	\$6-55 ,	12/24/= 2/26			20-27'			
5-3	NO SAN	the ta	لاولما	20-30'				
5-4	30-40'			LT BROWN SOND, WED, M-C	ANALYTICALS	0	٥	
Stone	40-42	7/12/14/2		LITTLE F, LITTLE F GRAVEL	TAKEN	+	9	0
S-5	40-50	77.9,476	-	SAME 4: ABOVE	S	0	L	
5-6	50-60			SAME AS 5-4	©	°	•	
5/00N #3	60 -62	6/1/12/22			ANNLYTICALS TAKEN, WATER			
s- 7	60-70			LT BROWN <u>SAND</u> , POD, M LITTLE C, LITTLE F, LITTLE SILT	SD G4.5	0	٥	3
5-8	70-78			LT BROWN SILTY SAND, PGD. F.	(S)			
			,	B.O. E = 78'	78'			
				34072042				
		·						

FIE	LD BORING	LOG	Boring No. Bom-91-91X	
Project No.06853-03 Project Name TUDLAR AAP Page of Contractor LAYNE Driller G ROMIGUEZ Date started 10-27-91 completed 10-27-91				
Contractor LAYNE Driller G ROPLICUE Date started 10-27-91 completed 10-27-91				
MECTOS DUNE WALL			Protection Level	
Ground El.	Soil Drilled 46 '	4 below ground —	Total Depth 40 "	
Logged by PRR.	Checked by DRP	Date 10/30/41		

Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring			orng LEL
5-1	0-10'			BROWN CAYEY SUT, PHO, TR & SAND, COULSN'E (DAMP	sm)	JAR	AIR	a
5-2	10-20'	17-	,	SAME AS ABOVE LT BROWN SAND, WED, C. SOME F GROVEL, SOME M SAND.	(Sui)	0	0	0
5/00 N		7/9/8/10			SAMPLE TAKE	<u> </u>	-	
s- 3	Zo-30'			LT BROWN SOND, WCD, M-C SOME F, LITTLE F GRAVEL, TRL SICT	20.22	0	•	0
5- H	30 - 40'	3'	- 34.	SAME AS 5-3 Brownsu-RED SILTY SAND, WED, C, SOME M., LITTLE F, LITTLE F GRAV SHOUTET CONESIVE, LEUSE, OF GREY CLAY. WEATHERED SANDSTONE FROM 3G-CIO BODING Abandoned on 10/28/91		0		

FIELD BORING	LOG	Boring No. Bom-11-02							
Project NO 06853-01 Project Name BADGER AAP Page Of									
Contractor LAYNE Drillery. 72	DRICULZ Date started //-	5-9/ completed //-4-9/							
Method Dual wall Casing Size 9" O.D.	HNU 11.7/10.2 Pr	otection Level D							
Ground EL Soil Drilled 87'	4 below ground 76.5 To	tal Depth 87'							
Logged by RRR Checked by DRT	Date 11/11/41								

Sample	Depth in	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	-	torng
5-1	0-10,			BROWN CLAYEY SILT CONESIVE, PLASTIC, TR C SAME TR F GRAVEL	MU	JAR AI	4
5-2	10-20'			LT BROWN-RED SAND NED M-C, LITTLE F, LITTLE F GRAV LITTLE SILT	4 11-5-91 W 11-6-91	•	G
SPOON	20 - 22'	7/11/14/19		Stoan # 1	AHALYTICALS TAKEN 9:25 Z YOU'S 5 8-08		•
s-3	zo- 3º'			LT BROWN SAND, WGD, M, SOME C, SOME F, TR F GRAV, TR SILT	(5.9)	1	0
s-4	30-40			SAME As 5-3	Sw	1	0
at s Recor	40 -42'	5/12/24/30		5700N # 2	ANALYTICALS /01/3	1	0
5-5	40-50			SAME AS 5-3	©	1	0
5-6	50-60'			SAME AS 5.3	(m)	1	0
SPORM # 3	60-62'	7/17/23/35		SPLIT SPOON # 3	AWALYTICAL SAMPLES	11.	•
5-7	60-70'			10 BROWN SAND, PCD, M. Some F. LITTLE C. TR SILT	S ?	1	0
5-8	70 - 80			LITTLE F. TR SILT.	SP	,	6
S-9	80-87'	·		B. C. E. = 87'	3 0		

Fil	ELD BORING	LOG	Boring No. 8cm 91-02
Project No.06853-03	Project Name BADGER		Page of(_
Contractor LAYNE	Driller G. R	ONDERUS ? Date started //-	7-9/ completed //-7-9/
Meanod Procure		HNU 11.7/10.2 Pr	otection Level D
Ground El	Soil Drilled /00'	4 below ground 79 To	tal Depth /00 '
Logged by TEIEIZ	Checked by DRP	Date / /9	

PIM Comments on Advance of Boring Sample Depth in Blows per Monitoring Description Feet 6 inches No HNU LEL TAR ATR LT BROWN - RED SAND, WED 5-1 (Sw) 0-10' m, some c, some F, some-LITTLE SILT, LITTLE F GRAVEL LT BROWN SWO, WED, M-C 10-20' 5-2 (S w) SOME F GRAV, LITTLE C GRAV LITTLE F SAND, TRSILT, TR . ಬ್ರಾಕ್ಟಿಯ 43/12/19/22 SPOON SAML AS 20-30 (5-3) ANALYTICAL SAMPLES 20-22' #1 5 8-06, 2 VOAS 21'BUS - 1" THICK CLAY LENS 11:10 LT BROWN SAND, WEB, M-C. 5-3 20-30 0 (50) 0 LITTIE - SOME F GRAV, SOME F SAND . TR C GRAVEL . 30-40 5-4 SAME AS 5-3 (S m) SPOON DHELYT/CALS 10/12/15/29 40-42' SAME AS 5-5 5 8-02 2 VOA'S #2 //: 30 LT BROWN SAND, MOD CD, 5-5 40-50 (5 w) 0 0 M. SOME C, LITTLE FGROW TR BLACK CLAY PELLETS & SORUBNIC COOKING CLAY) 5-6 50-60 LT BROWN SAND, PGD, M, SONE đ 0 (SP) C, LITTLE F, TR F GRAVEL . 0 SPOON 60-62 5/12/22/35 LT BROWN SAND, PLD, M-F AWALYTICALS # 3 LITTLE TO SOME SILT, SOME 11:52 TO LITTLE M , TR C SAND . 5 8-02, 2 VOA'S 5-7 60-70 LT BROWN SAND AND SILTY G) SAND W/ INCREASE IN DEPTH PUB F, TRM. 5-8 70-30 0 0 LT BROWN SILTY SAND, PGO (50) F, NON PLASTIC, NON CONSINE. 79' 5-9 20-10 Sol- 81 SILTY SAND AS ABOVE 81- 24 CLAY, COULSIVE, BRITHE, BROW LT BROWN SILTY SAND AS ABOUT SP 84-90 LT BROWN SAND, PGO, F-M 5-10 90-100 6 TR C

95-100' - LT BROWN GRAVELY SAND

WEN, SAND: M-C, LITTLE F

LITTLE SILT

GRAVEL: F, LITTLE C

TR C

FIELD	BORING	LOG		Boring No. Preglo/
Project No 685304 Project	t Name USATH	AMA	BAAP	Page _ 1 _ 01 _ 4
Contractor MATHES	Driller T. C	RANK	Date started	10/11/91 completed 10/12/9)
Method HSA 4%" Casing	Size	HNU 11	7(102) # 3	Protection Level D
Ground EL Soil C	milea 104.5	₽ bek	ow ground	Total Depth 106.5
LOGGED BY EANDIN CO	euted by DRP	O:	ne 10/14/91	

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	Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring HNU LEL
243	5-1	0-2	2/3/ 4/4	3/ 2	dart brown Early silt organic rich dense.	Reference Sample	JAR AIR BU
250	5- Z	2-4	2/3/4/ 4-	2.0	dark brown sandy silty toyse, 1 similar to 5-1	Reference Sample	ski.
3	S-3	4-6	14/4	2.0	Sample appeared to be topsvil with grass so ring was instructed to redrive spoon	Analytical Sample P9101006 No Sample	byle
٠.	5-3 2nd time	4-6	wt. of namues	2.0	No recovery		
310	s-4	6-8	:/3/2/ 2	20/30	brown to black sandy sith with clay, 7-8 feet black asphalt	ANAL SPLE P9101008 STATE OFFICE STATE OFFICE STATE OFFICE STATE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE	3-XCB
1315	s- 5	8-10	·	2.0	chunks mixed with sandy sitt 8-8.4 orangebon sandy sitty clay	Reference Sample	مراه

FI	ELD	BORING	LOG		Boring No	PBBILL
Project No 645303	Project N	ame USACH	AMA	BAAP	Page Z	01 4
Contractor MATH	E 9	Driller K. C	RANK	Date started	10 1, 41 completed	10/12/91
Method HSA	Casing Si	28	HNU 11	7(02) 43	Protection Level *D	
Ground EL	Soil Onlik	104.5	₹ bet	aw ground	Total Depth 106.5	
Logged by ES	Check	ed by DRP	Di	ne 10/4/41		

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	Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring HNU LEL
1325	10-12 5-6	6	10-12 feet bgs	17	light brown sand fine to coarse with 30-40% rounded gravel, loose dry	Analytical Sample P9101012	TAR ATR
	s-7	12-14	50/5"	0.4	sand and gravel loose refusal on cobbles	Reference Scupic	8)Xia
1355	S-8	14-16	29/ 43 for 51/2"	1.2	tan silty gravelly sand. 40% graves loose, dry	Analyticie Sample 199101016	ex-
1405	5-9	16-18	47, 46 33, 33	2/20	tan gravelly sand	Agalyticis Sample P9101018	Okra
1430	5-10	من-18 ع	14,24 \$7,24	2.0	tan graved sand becoming well sorted fine sand	Reference Sinyle	SXC
1440	s-n	20-22	37,25	7.0 2.0	19-20, TAN GRAVILL SAND BELOMING WELL SORTED FINE SAND, MOIST, DEVER, OUTWASH	AMEYTICA C BAMPLE 19101022	84.5
	5-12	24.5- 26.5	2-22 24-24	z.º 1.3	Tan Gravelly Sand moist, dense outwash	Reference Sample	ayke

FIELD	BORING	LOG	Boring No. PBB 9/01
Project No GRESOS Project	Name USATUA	IMA GAAP	Page <u>9</u> of <u>4</u>
Contractor MATHES	Driller T. C.	MANK Date started	10/11/91 completed 10/12/91
Method HSA Casing S	Ze	HNU 11.7/102 # 3	Protection Level D
Ground El. Soil Drill	ea 104.5	4 below ground	Total Depth 106.5
Logged by ES Check	red by DRP	Date 16/14/41	

÷	Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring	_
	5-13	29.5- 31.5	15/84/25/35	D.O. O.	tan sand fine well sorted monst tragraved to core sol	Analyticae Sample P9101031	TAR AIR	. <u>L</u>
1520	5-14-	39.5- 41.5	5/18/ 45/35	o o	tan sand fine moist, well sorted	ANALYTICAL SAMPLE P9101041	\$\forall \alpha \tag{\alpha}	
.530					tem sand fine well sorted morst trave gravel	ANALYTICAL SAMAR P9101051	BYO	
(545	5-16	59.5- 61.5			tan sand fine well sorted , no graves motest	Aralyticale Scimple P9101061	Brie	
○] (*)		69.5- 71.5	8/ <u>50</u> 4"	3 M 3	tan sand fine poorly graded with trace gravel	Anolytrice Sample P9101071	ax a	
625	5-18	A.5-	20/2.		NO RECOVERY	NO SAMPLE		
<i>64</i> 5	5-19	-7.88 2.19	14/30) 40/50 ^{3"}	14/2	tan sand fine poor graded very vell sorted minist	Analytical Scimple	र्भुद	
0171	5-20	99.5- /0/.5	14/50	-	tr. gravel sand and gravel loose, rock fragueits	P9101091	(A)	

FIELD BORING	LOG	Boring No. PBB9101
Project No 655363 Project Name USAT	NAMA RAAP	Page 4 of 4
Contractor WATNES Driller T. C.	LANK Date started	1) 1) 1 completed to 12 1
Method HCA Casing Size	HNU 11.7 (10.2) 43	Protection Level D
Ground EL Soil Drilled 104.5	4 below ground	Total Depth 106.5
Logged by E.S. Checked by DRP	Date 10/14/41	

Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monit
S-21	104.5-	18/18/	20/0		P9101105	JAR AIM
				Bob augus 104.5 spoon 106.5		
!						

FIELD	BORING	LOG	Boring No. PB3-91-02					
Project No.6853-03 Project Name BAAP Page 1 of 4								
Contractor MATHES	Driller Kenth	Busiding Date started	0-11-9/ completed /0-12-91					
Method IISA Kma 75 Casing !	Size 4.25"	HNU 11.7 (10.2)	Protection Level D					
Ground EL Soil Dri	Hed 110'	4 below ground: 105	Total Depth 10					
Logged by RIM Cher	ted by DRP	Date 10/14/91						

TIME	Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	MO	nito	rng	574.7
15:12	5-2	0-1.5		1.0	Black Silty Clay; trace Organic mostl. and fine Sund; top soil, dry. (CL)	Rolevice.	JAR			BL,
15:71	5-Z Muzeof	2-3.5	2/5/5	1.5/	Brain mother ctay; little sitt; trace fine sand; dry, soft, (i)					
15:24	5-3	4- \$.5	2/4/4	1.5/	Brown to Black fine Sund; little exerter sind out charcol (KII): trace fine counted grand out	Reference				
		6-7.5		1.5/	silt; dry. (FILL) (SP) No Recovery	Stone/bulder blocked sper				
15:40	S-5 ⁻	8-9.5	z/s/4	1.57 NR	No Recovery	157 attempt no reconvy - 2nd attempt split spen with fall in some hole - adu. nugens to 10'				
15:47	echorals 2-6	10-12	8/22/25/ 42	1.0/	middle 09-1.2'- Black Silty medium Such; true medium granel; teret; TOP 1.2-1.5'- Brown medium to course Surel: little C.	Deiller hung difficulty removing thy - an old rail was lutted between the play and the intide of the HSA. IS par at anythead without	1 (gr)		150
					gamel; wot. Comms pulle west like according (500/ Flee)					

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FIELD	BORING	LOG	Boring No. PBB-91-02
Project No GE:53-03 Project	Name BAAP		Page of
Contractor in Athris	Driver Keith Bus	xherry Date started 10-	11-9 completed 10-12-5/
Method HSA/CHE 75 Casing	Size 4.75"	NU 11.7 (02) P	rotection Level 🎞
Ground EL Soil Dri	ned 10'	4 below ground 2 105 To	otal Desth / 10
Logged by RIM Che	ted by DRP	Date 10/14/91	
•			

TIME	Sample	Depth in Feet	Blows per 6 inches	Pen Hec	Description	Comments on Advance of Boring	Monit	orng LEL	S it
16:12	5-7	17-14			Brown to tem fine to coarse sind; little fine to medium grand; wet at top of spoon. (FILL) (GW)	50 pp. et supe houl Reference	TAR ATR		٥,٥
16:20	5-8	14-16	100 Gr	3%	No Zerosary	PATIUE		78ks	
16:31	5-9 pgot ⁰¹⁸	16-18	56/100	0.8	Ten fine Send; trace median to fine growth; dry (57)	no ppm at cupa hand anothing in tracetong eve The cur smalls sweet accussion ally in treathing time. Anosytical		But.	(, C
16:41	5-10 5-10			15	fore sent and 511; sift; Tup 0.3-1.5'- Too medium Send; 1.4le Are to medium argular yranel and fore send; dry (50/500)	15 pm at anyon much Analytical	131-3	ßkţ.	19
162.50	S-11	70-27	16/16/23/37	1.0/	Rutton 0.6- Ten medium Sul; little fine and worse Sud; true fine randed grand; middle 0.6-1.2' Tan Silty fine Sul; Top 1.2-2.0'- Ten to brush mediu e 0.	Analytical	Ŷ	Dky.	bry
					modin sul; som course sund; little has sounded grund and fine sund; dry (SI/50/500)				

FI	LD	BORING	LOG		Boring No. PBB 11-02
Project No 6853-03	Project N	ame BAAA		·	Page 3 of 4
Contractor MATHES		Driller		Date started	10-11-91 completed 10 -17-91
Method HSA/Crust 75"	Casing Si	10 4.25"	HNU 11.	7(102)	Protection Level D
	SON Drille		T bek	ow ground's 105	Total Depth 10'
Logged by RHA	Check	ed by DRP	Da	10/4/91	

TIME	Sample	Depth in Feet	Blows per 6 inches	Pen	Description	Comments on Advance of Boring		torng	
17:00	5-12	25-27	15/14/21/27		Bottom 1.9' - Ten medium		JAR AZI	e	
•	१५ /७८०६७		, , , , ,	1.8		Analytical	34,	Bay	Bhy
					The 1.4-1.8' Tax medium				
		-			soud; true was t sud and fine sub runded ground; dry. (SP)				
(7) 15	S-13 phouse	30-32	12/18/27/32	20/	Tow medium sind; true course sent out fine to modium surroyaler grand;	Andytical	Gy	Bk.	BL
17:40	5-14	40-92	11/16/25/36	1/	homy minorals, by (5P) Tan medium and fine sund.	Andrick	35	Dk _r	131
. !				(17	trace course sand cul madeun conjular gramel; bry Sample perposerted w/heavy minords. (SP)	Reference			
18:50	5-1 5 १ थ ण्डब्डर	50-52	i423/24/36	20	modium such and fine constall grand; dev (50)	Analytical	84	3 BKJ	34
07:40	5-16 P110 4 062	60-62	14/17/22/98	2.0	Tim modium Soul; some Fine soul; trace medium	Analytical	City	Dk,	Bi,
					soul; dry, (SP)				

FIELD	BORING	LOG	Boring No. Pagg
Project NOG853-03 Project	Name BAAP		Page 4 01 4
Contractor MATIKES	Driller Iceith	hasther Date started	10-11-91 completed 10-12-91
Method 1/5A /Cm K 75 Casing	Size 4.25"	HNU 11.71(0.2)	Protection Level D
Ground EL Soil D	rilled JiO'	4 below ground 2 los	Total Depth //o'
Logged by RHA Ch	screed by DRP	Date 10/14/41	

10-12-91

TIME	Sample	Depth in	Blows per	Pen	Description	Comments on	Monit	orng] "
11m2	No	Feet	6 inches	Rec	OESC IDEA.	Advance of Boring	שאא	_	2507
Q8:55	5-17 19102078	70-72	25/50/44/	2.5	Ten ou Brown makin m Soul! Some comose seed; title	Andytical	JAR ATR	1	نىدر
		٠.			fine to medium nagular to subsurated pravals true four sand; day (sw) popperad without minorals				
७ ६:२६	ડ-18 ભાગ્દેલ્ટર	go-82	=7/50/53/	2.4 2.4	medium med		Ch	rk _j	; ')
01:20	5-19 P4102672	c10-92'	13/2/2/20	2.14		Andytick	Day	Bky-	Bk_
09:30	5-20 141020C	100 -10Z	21/41/54/	2.0	SAME AS ABOUT (SW)	Andy+ical	Skj	BICA	ton
/o:3 •	5-21 Muzu2	//0-11Z	9/35/42/57	2.9	SHAME AS ABONE, WET (SW)	In wester - 8 cf hower of Andria emps. T.D. 110	, ay	₹	10:

FII	ELD (BORING	LOG		Boring No. PBB9 163				
Project No 685303 Project Name USATHAMA BANB Page of _4_									
Contractor MATH			RANK	Date Started	10-12-91 completed 10-12-91				
Method NSA 41/4"	Casing Size		HNU 11.	7(102)#3	Protection Level D				
Ground EL	Soil Drilled	99'	早 bek	ow ground	Total Depth [O]				
Logged by E.S.	Checke	or DAP	Da	re 10/14/91					

ME	Sample	Depth in Feet	Blows per 6 inches	Rec	Description	Comments on Advance of Boring	Monitoring		
							JAR ATR		
	15-1	0-2	11-3-4-7	عبظ	Dark brown sand sitt	refusive			
				1.6	with organics plastic	SAMPLE	348		
		İ	1		targes 0.6 black		2		
		ĺ	İ	Ì	chips (asphalt?) SM				
	1			_ ^		Analyticas			
035	5-2	2-4	2-7-10-5	فيغرا	Dark brown organic	Sample	*KC		
				1,9	rich sandy silty topsoil	19102004	16		
			ł	1	dense, Ash freigments	1 1103004	1 1 1		
	•		İ		Sm				
	1	i	}		medium brown slighty	Analytical			
50	5-3	4-6	5-8-7-	2.0	medium brown slighty	Sample	الما		
			7	1.6	sandy silt, moist, dense	P9107 0010	346		
		{	['	,, -	moverately plastic Sm	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
	Ì								
	5-4	6-8	3-7-8-	2.0	medium brown		1 1 1		
	, ,		15		sendy silt moderately	leterence	45		
	1	1	1	1.5	sendy silt, moderately plastic. Sm	Saw	N/A		
	1	1	1		•				
	5-5	8-10	2-7-12	, _	light brown sond		1 1 1		
			7-7-15	6.0	Con harman sala	Reference			
	1	1	33	1.8	fine to course with	Sample	37.6		
	1		•		weathered fine gravel		6		
	1	١.	1-		SW _				
20	5-6	10-12	50/50	.3	tan fine to coarse	ANALYTICAL			
	i	Ì	/ 5	100	sand with 40% graves	Sample	2X		
	ı		j	1.0	tan fine to coarse sand with 40% gravel loose, dry SW	2103012			
	1				10034 , 019 344				
	8-7	12-14	14-70-	9.0	to Chand the	_			
	10.1	' • = ' T	20-25	4.0	tan fine sand with	Reference			
			63	1.9	10%. Arabel and two		1		
					sandy silt 70nes from 12.4-12.6 and 13.3-13.4	· marking	278		
					15 4 15 - 64 133-134				
_				·	12.4-12.6 and 17.5				
					SP/SM				
	ł				, and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second		1 1 1		

FIE	LD BORING	LOG	Boring No. 1989192
Project No (85303)	Project Name USATHA	MA BAAP	Page 2 of 4
Contractor MATHES	Driller T. CR	ANK Date started 1	1-12-9/ completed 10 12/91
Method HEA 4'4"	Casing Size	HNU 11.7/102 #3	Protection Level D
Ground EL	Soil Drilled 94'	4 below ground	Total Depth IDI'
Logged by £,5,	Checked by DRP	Date (0/4/41	

	Sample			Pen	' December	Comments on	Monito	rng
	No	Feet	6 inches	Rec	Description	Advance of Boring	HNU	LEL
1140	S-8	14-16	7-16-	20/9-	14-19.4 tax sound v. fine well sorted, moist	MNALYTICAL SAMPLE	JAR ATR	
					sorted, fine 14.6-15.9 tan saud fine— medium 15.1-15.9 light brown V.f. to fine sand well sorted SP	7 9103 01 6	\$X6	
(50	5-9	16-18	12-11-28-28	2.0/15	tan finic sand well sorted bose SP orange tan last 0.5 feet with weathered dolomite, dry	ANALYTICAL SAMPLE P9102018	at yes	
	5-10	18-20	3-10- 16-27	2/2	tan fine sand with 10% gravel, loose slightly moist. SP	reference Sample	SK46	
1200	5-11	20-22	27-28· 27-31	2.0	tan sand fine with some med - coarse and 10% gravel. grey sand byer @ 20.3 - 20.35 coarser sand miteral	79103022	γγ¢	
	5-12	22-24	14-20 28-35	20 2.0	tan fine well sorted sand with coarser layer & coorse sand and special SP	Reference Sample	444	

FIE	LD BORING	LOG	Boring No. PBB9103						
Project No 6853 05 Project Name USATHAMA BAAP Page 3 of 4									
Compactor MATHE	Contractor MATHES Driller T. CRANK Date started 10-12-9 completed 10/12/91								
Method HSA 41/4	Casing Size	HNU 11.7/10.2	Protection Level D						
Ground EL	Soil Drilled Off'	4 below ground	Total Depth Di						
Logged by & S.	Checked by 120	Date 10/14/91							

TIME	Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring
	5-13	24-26	-0 E- 2 52-00	200	ton sand with multicolored gravel sond is predominently fine with 5% med - quests. SP/SW	Reference Sample	TAR ATR
					tan sand and gravel similar to 5-13 loose, slightly moist. SW	Reference Sample	A C
	5-15	25-30	12-15- 28-26	2.0/8	tan sand fine, well sorted with 5-10%	Analytice Sample 19103030	346
320	5-16	39-41	5-13- 30-4-8	20/20	tan sand very fire- fine, well sorted trace fine gravel disseminated throughout faint horizontal lamination slightly moist. SP	ANAYTICAL SAMPLE P9103041	846
25.35	S-17	49-51	10 -20 34 -43	0/0	tan sand fine, well sorted 19.7-19.8 med-cse sand. 49.8-51 fine sand occassional faint lamina, tr coasesd laminations. SP	ANALYTICAL SAMPLE P9103051	9.4G

FIELD BORING	LOG	Boring No.P869103
Project No 685363 Project Name USATH	AMA BAAP	Page 4 of 4
Contractor MATHES Onler T. C.	RANK Date started to	-12-9 completed 0 12 9
Method HSA 4/4" Casing Size -	HNU 11.7 (10.2) D P	rotection Level D
Ground EL Soil Ornilled 99'	4 below ground To	ital Depth 0
Logged by ES Checked by DRP	Date 10/14/41	

	Sample	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring
1400	5-18	 	10 - 20 - 22 - 27	-		destructive)	TAR ATR
1415	5-19	Í9-71	17-33- 40-42		fine to coarse sand	ANALYTICAL SAMPLE P9103071	946
1435	S-26	79-81	22-23 23-25	بر و. (بر	dry. SW	ANALYTICAL SAMPLE P9103081	akir -
1505	9-21	89-91	43/50	0. 0. 0.	Gravel Similar to 5-20 SW	ANALYTICAL SAMPLE P9103091	476
1830	5-22	99-101	7/14/20 20	<u>30</u> 14	fine to coarse sand and gravel (40%) Saturated 5W	ANAUTICAL SAMPLE P 9103101	9.5%
				·	WATER IN AUGERS AT 98.5 bgs BOB 99 AUGERS 101 LAST SPUT SPOON		

FIELD	BORING	LOG	Boring No. PBB-91-04						
Project No 6 853-03 Project Name BA4P Page 1 of 5									
Contractor MANIES	Driller Keith B	unsilmen Date started	10-13-91 completed 10-14-91						
Method HSH /CHIR 75 Casing Si	ze 4-75"	HNU 11.7402	Protection Level D						
Ground EL Soil Drill	105"	4 below ground 10 Z	Total Depth /05/						
Logged by 12 H/A Check	ed by DRP	Date 10/15/91							

_	Sample	Depth in	Blows per	Pen Rec	Description	Comments on	Monitoring	32
TIME	No	Feet	6 inches	uec		Advance of Boring	HNU LEL	5/2
13:30	S-1	0-2	4/5/6/9	1.0	Button 04' Brown fine sendy sitt; truck organics;	Reference	TARAIN BK	71.
13:34	-5-2	其- 뵥	4/5/7/7		Sond; 11 the modium gravel; dry - Typ Soir (SM) Brown Clayey fine Soird (SC) (evers) dry.	Reference	B\$ 136 3-	BL
38	5-3	4-6'	10/26/35/38		Button 1.1'- Brown fine 'nd; Some medium sanch; little coarse sand and fine to make subscirably framed (Fice?); Topo 1.1 -1.5 Brown Sandy (Iny (Coess) (SC).dry	Reference	943 BK.J.	BL
13:51	s-4	6-v'	27 4 9 50 ₄₅	20/	Brown fine to ware such; some fine to coarse grand ond rock frags.; trace green sand in middle of spoon; dry (EW/Fice?)	Anclytical	By 3k,	ßL,
14:00	5-5	8-10	f1 <i> </i> 41/ <i>59</i> /53	2.0/	Rows five to coarse send; some five to worse granelyd bruthen rock frugs., black south material extrop of spour; dry (6m/Five?)		Bly Bk,	Th

FIELD	BORING	LOG	Boring No. 788-11-15
Project No 6853-03 Proj	ect Name BA	AP	Page _2_ ot
Contractor MATHES	Driller Kerth B	melmerer Date started	10-13-41 completed /0-14-91
Method HSH /CIME 75 Cas	ng Size 4,25"	HNU 11.7/ (0.2)	Protection Level TO
Ground El Soil	Drilled /05'	4 pelow ground 10	Z Total Depth /US'
Logged by RHA	Checked by DRP	Date 10/15/91	

TIME	Sample	Depth in	Blows per	Pen Rec	Description	Comments on	Monito		72
11000	No	Feet	6 inches			Advance of Boring	HNU	LEL	7
14;11 19104012	5-6 P910104	10-12	12/52/34/40	2.ij 1.6	Brown to The fine to coenser Send; Some fine to Coenser Grand; dry (GH/FILL?)	Andraica	TAR AIR	BKL	
14:25	S-7	12-14	7/8/16/18	20/	Tem bine soud; trace medium end cierse soud; dry. (SP)	Reference			
14:30	S- 8	14-16	5/12/12/16	1.19	The medium sand; little fine samt; truce coase sand of button of spoon; this had of black sit said is middle of spoon; dry(SP)	Récrence	કોપ્ <u>ર</u>		ß
14.35 P4104018	ડ-લ	16-18	8/12/17/27	z.e/ 1.8	RoHom 1.4'- Ten fine send;		σ _γ .	3k →	B)
,4 · 44	S-10	18+20	n/18/26/45	2.6	coerse send; trave fine to modium grand; dry (50) SW) Ten to brown fine to coerse- Send; "He fine to madium rounded yound; dry (5w)	2 oberonce	843	3rj_	,,
14:55 P41040ZZ	S-11	20-22	भ्दर्ग यहिस् ।	1.7	SAME AS ABOUT FROM 18-20 with rock frags. and HM-, dry; trace toket to green such at better of green. (SW)	Arabytical	843	Gly.	! -

FIELD	BORING	LOG	Boring No. PBB-91-04						
Project No. 253.03 Project Name BAAP Page 3 of 5									
Contractor MATHES	Driller 14-1745	PASCLINA Date started A	0-/3-9/ completed 10-14-9/						
Method HA/KMK 75 Casing S	ze4.25"	HNU 11.71(02)	Protection Level [7						
Ground EL Soil Dril	ed /05'	4 below ground/07	Total Depth /65"						
Logged by RHI-1 Chec	ced by DRP	Date 10/15/41							

.

TIME	Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring		torng	3761
17701-	- '\'\			_				LEL	520
15:04	5-12	22-74	164/Rodussi	0.5/	C C + + + + C	Reference	TAR AT	- 7 .	βk _y
15;16 i104026		:	64/70/100	0.1	For sonk, dry (SP)	collected vocs	34,	Blct	13 k
15:26 Pilotoza	S- 14	26.28	16/18/14/20	24/	Ten medium and fine soud; trace coarse and fine to medium grand; black wet seems near top	Andytical use only	84.	314	7. `
					seem now horles of somme containing columber - 7 ppm (SP)				
15:35	5-15	29.30	13/16/18/35	2.0	Tim modium Soud; little fine soud; trace coerse soud; theyers of green stained send - 5 ppm; damp (SP)	Perfence	יַעד	išky	5.
15:31 1104032	5-16	30-3 Z	<i>ાક4નીશ્રના</i> ૧૬	ر کوئ	The fire to medium Soud; trace coarse sind and large rounded yound and Hom. grown stained soil at top of spoon; dry. (5P)	24 ppm cit augus horal, Anchytical cippe on Carlon Tetrachlor. Drage Talaa. Volctiles collected from top a f spoor	5 2.	Blug.	٤.٠
		·							

FIELD	BORING	LOG	Boring No. PBB-91-4						
Project No (453 v3 Project Name 8,440 Page 4 of 5									
		medinates Date started,	v-13-51 completed 10-14-91						
Method Hist/cari 7 Casing Siz	• 4.25"	HNU 11.7 (10.2)	Protection Level D						
Ground EL Soil Ornie	a 105'	4 below ground 102	Total Depth /05/						
Logged by RHA Checks	B BY DRP	Date 10/15/41							

	Sample	Depth in	Blows per	Pen	Description	Comments		Monito	سے خے ب]:
TIME	No	Feet	6 inches	Rec	out into:	Advance of		HNU		Spa
16:00 PG104042	S-17	40-42	હ્યું (સ્ટોસ્ટ) કહ્યું કહ્યું કહ્યું કહ્યું કહ્યું કહ્યું કહ્યું કહ્યું કહ્યું કહ્યું કહ્યું કહ્યું કહ્યું કહ્ય 	20) 10		50 ppm c. homê cá homeytica	st caper 35'1951.	TAR AIR	BIL	ا با
bd1.04025 1	S-18	50-52	16/20/22/ 132	Z.ů	Ten fine Soud 1, the medium send , trace corse send out have to medium substructed grand there of grown stained and throughout	Analytic	سل	35.	3ky	1 3
16:35 79104062	5-19	60-62	1418/21/32		sample; dry. (517) Tan fine such; little medium such; trace sulty fine sand in thin lanses; great stringed sand in bunds throughout sample;	Andytic	al ,	34	BLL	သံ
०८:06 २५१०४०७७	5-20	70-72	14/21/42/75	2.0	Ten medium Sand, 1. Hhe fine simb! frace course sand, out fine rounded goul Sample is stained grown in many arous: down in the	Zone. Ancúyt	ناه ه اده دن		OF	
<i>७</i> %∴३३ २१०५०१२	5.21	BC-87	40/52/32/ be	2.0/	lead stained and		L	ВЬ	Bly.	ريع

FIELD B	ORING LO	3	Boring No. PBB-9604
Project No 6853-03 Project Nam	· BAAP		Page _ 5 ot _ 5
Contractor MHTHES Dr	mer K. Bunselmeu	on Date started (6-13-91 completed 10-14-91
Method HEA / MAK TO Casing Size	4. 75 HNU	11.7 (10.2)	Protection Level T
Ground EL Soil Drilled	105' 4	selow ground/02	Total Depth 105
Logged by Pilly Checked	by DRP	Date (0/15/41	

	Sample	Depth in	Blows per	Pen Rec	Description	Comments on	Monito		5pc
TIME	No	Feet	6 inches			Advance of Boring	HNU	LEL	25.
08:55 08:55	5-22	96-92	5/21/19/ 1/24	2.9	Rothern 1-1'- Tim fine ml medium soud; trace	Analytical	JAR AIR Bhy	Blcz	Ble
	·	•			Tempolium sed; trace course sund and fine				
					runder gratiatry. State their of whom, but no staining. (SP)				
79104102	5 -28	10E-10Z	43/42/31/ 18	20	To to Brown for to roine full form for to inchiam groli, dry	And ytick	R/L	Bly	ぴん
9:45 (4104107	s-14	105-167	25/4/ 17/18.	1.57	Brown fine to course Soul; some fine grand; true medium grand, wet. (SW)	Analytical Sounded BTW et 102' in angers. F	'	rsky_	Gŧ,
	·	•				T.O. 105			

FIELD BORI	NG LOG	Boring No.PBB9105							
Project No 685303 Project Name US	athama baap	Page of							
Contractor MATHES Driller	التبرية والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والمستور والم								
Method HCA 4'4" Casing Size	_ HNU 11.7/102) #3 F	Protection Level D							
Ground EL Soil Drilled 99	4 below ground T	otal Depth O							
Logged by ES/DL Checked by	DRP Date 10/15/91								

	Sample	Depth in	Blows per 6 inches	Pen	Description	Comments on Advance of Boring	-	_	rng
•	5-1	0-2	-11.1	2/2	silty gravely sandy fill	Reference Sample	3000 E	E are	LEL
					0.5-1.6 dk brown to brown sandy silty topsoil slightly plastic, dense ML	•	Bra	\$	₹ X
	3-2	2-4	3/4/5/3	20	brown sandy silt dense slightly plastic ML	Reference Sample	6.76	\$	
1045	,				ten send, granel, loose cobble preces, dry	ANALYTICAL SAMPLE P9105006	Ť	\$	
	S-4	6-8	11/21/ 39/44	N.O.	tan sand, fine to coarse, loose with 30% gravel, dry SN	Reference Sample	S.	SYS.	
	S-5	8-10	35/ <u>5°</u> 5"	0.9	tan sand and gravel similar to S-4 SW	Reference Sample	3	35	
	8-6		B0,	1.4	ten sond and gravel similar to 5-5 SW	Reference Sample	3	\$	
(/20	5-7	12-14	28/40/ <u>50</u>	4/13	finie to coarse sand with 60% graves bose, slightly moist GW	ANALYTICAL SAMPLE	5	oks	
	4	[4 -1 6	25 30 35 40	20/14	tan to light bown gravely sand fine to coarse, collie and gavel fragments, loose, dry sw	Neferonce Sample	Š	248	

FIELD BORING	LOG	Boring No. Progriss
Project No 685303 Project Name USA-TH	AMA BAAP	Page 2 of 5
Contractor MATHES Onlier T. CT	ANK Date started ID	-14-91 completed 10-15-91
Method HSA 4/4" Casing Size	HNU 11.7(10.2) 43 A	rotection Level D
Ground EL Soil Drilled 99	4 below ground To	otal Depth /0/
Logged by ES Checked by DRP	Date 10/15/91	

						*	12 L
Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	¥ 5	onitering
5-9	16-18	19/38	2.0 1.5	tan to brown sand fine to coake with 40% gravel SW	Reference Sample	200 3	\$ QY)
S-10	18-zo	6/13/18 2+	2.0 1.0	tan Sand Fine well sorted, trace coare sand, fine gravel loose, slightly moist sw	Reference Sample	S. S. S.	\$ Yes
5-11	20-72	17/17/ 25/40	2.0	ten Fine sand well sorted moist occaissions darker lamina and	Reference	84	\$
S-12	22-24	8/21 23/25	20	no tip response. SP tan to light brown sandy gravel, loose no abvious discoloration slightly moist GW	Reference Sample	,	ልአ¢
5-13	24-26	8/16 25/50 5"	2.0 2.0	ten sand fine well sorted to fine-med well sorted 0-10% gravel	ANAUJTKAL SAMPLE P9105026	5	945
		·	-	loose, slightly moist. 24.6 - 25.0 motiled penny size gran discolution shight yellowish tint to most of sample SP	Ret. Jar headsp	2	

FI	ELD	BORING	LOG		Boring N	O. PB&919					
Project No 685303	Project No 685303 Project Name USATHAMA GAAP Page 3 of 5										
Contractor MATHE	.s	Driller T. CP	ANK	Date started	10 -14 -91 completed	10-15.91					
Method HSA414"	Casing Siz		HNU T	1.7/10.2) \$ 3	Protection Level D						
Ground EL	Soil Orille	99	平 be	ow ground	Total Depth /O/						
LOGGED BY E. SAN	DIM CJecke	d by DRP	0	ate 10/15/91							
•						8 %.					

			r _				87	0,3
	Sample No	Depth in Feet	Blows per 6 inches	Rec	Description	Comments on Advance of Boring .	洲	iu LEI
f0S	8-14	26-28	4/20/ 30/33		tan gravelly sand fine to coarse with 40% gravel and cable pieces. loose. moist SW	ANALYTICAL SAMPLE P9105028	3	AF ONE
	6-15	2 2- 30	21/19/36	2.0/ 2	ton-brown as fine to medium sand with 20% fine rounded gravel slight yellowish tiff to sil. odor, slight moist appearence SW	Reference Sumple Jar Headspace 6 ppm	5	পুদত
43o	5-16	₹ 0-₹2	25/29 32/40	2.0/20	sand tan to tanyellow fine wellsorted to fine to coase with gravel, loose, slightly moist, odor SP	Analyticab Sample P9105032	3	SV.
440	s-17	37-41	4/13 25/33	N.0/9	sandtan, fine to coarse with 10-15% gravel. loose, moist SW	ANAUTICAL SAMPLE P9105041	\	843
1510	S-18	49-51	7/21 30/19	7.0	Sand tan fine well corted with horizonted yellowish laminations occasissioned zones of fine to coarse sand with gravel SP	ANALYTICAL SAMPLE P9105051	3	bxe

FIELD B	ORING LO	G	Boring No. 1889105							
Project No 685303 Project Name USATHAMA BAAP Page 4 of 5										
Contractor MATHES OF	riller T. CRANI	L Date started	10-14-91 completed 10-15-91							
Method HSA 4% Casing Size	HNU	11.7(10.2) # 3	Protection Level D							
Ground El. Soil Dritted	99 2	below ground	Total Depth /D/							
Logged by E. SANDIN Checked	by DRP	Date 10/15/91								

.

	Sample No	Depth in Feet	Blows per 6 inches	Pen	Description	Comments on Advance of Boring	Monitoring HNU LEL
1530	5-17	59-41	9/2437	2.0	sand, tau, very fine well sorted with frequent cardboard thin coarser lawing. no apparent discoloration dry appearence SP	Analyticie Sample P9105061	AND TOUR BY
1545	6-20	L9 -71	5/15 24/41	2.0	send, ten, very fine well sorted slightly maister than 5-19. odor 2' from spoon	ANALYTICAL SAMPLE P9105071	5 840
1600	5-21	71-73	9/20	N.O.	Sand, tun very fine similar to 5-20 SP	ANAL. SAMPLE 19105073	ske
,620	5-22	79-81	11/24/ 50 5"	0.3	Gravel losse with fire to coanse san A GW	ANAL. SAMPLE P9105081 VOC'S ONLY due to poor recovery	ALA GY
1645	5-25	89-91	<u>50</u>	0.2	ston refused due to gravel. GW	No SAMPLE	at at
1700	S-24	99- 10(26/48/ 48/ <u>56</u> 3"	17/17	tan sand, fine, very well sorted, trace small gravel, trace coaser lamina SP	Analytical Sample P9105101	8 Kr

FI	ELD BO	RING	LOG		Boring No. Persios
Project No 685303	Project Name	USATH	AMA	BAAP	Page <u>5</u> of <u>5</u>
Contractor MATH	ES Drill	er T. 4	-RANK	Date Started	10-14-91 completed 10-15-91
Method HSA 4 4	Casing Size		HNU 11.	71702) 43	Protection Level D
Ground El	Soil Orilled	99	2 belo	w ground	Total Depth 10/
Logged by E.S.	Checked by	DRP	Da	· 10/15/91	

Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring HNU LEL
5-25	10A-111	12/26/ 37/37	20/20	Sand, tan, fine to medium, trace coarse sand and gravel. wet SW	Analytical Sample P9105111	Stand Of Stands
	•			BOB 109 AVGERS 111 LAST SPLIT- SPOON		
		·				

FI	ELD BORING	LOG	Boring No.Pes 9106
Project No 68530	Aproject Name BAA	P	Page or
Contractor MATH	ES Onlier T.	CRANK Date started	10-13-91 completed 10-13-91
Method HSA	Casing Size 41/4"	HNU 11.7 (10.2	Protection Level C
Ground El	Soil Drilled 109	4 below ground	Total Depth ///
Logged by ES	Checked by DRT	P Date 10/14/91	

	Sample	Depth in	Blows per 5 inches	Pen Rec	Description	Comments on Advance of Boring	_	nito	
							TAK TAK		LEL
	S-1	0-2	6	1.0	Dark brown silty sandy topsoil with roots	reference Sample		_	
					medium to dark brown silty sand with roots sm	·		St. Ye	
	5-3	4-6	2/3/3/3	いくい	medium to dark brown silt and silty sand less noot matter, dense slightly plastic sm	Analyticae Sample 79106006		Bko	
	s-4	6-8	42/2/3	2/8		Reference Sample	,	8X5	,
	S-5	8-10	= (इ हि १७	و م\05	8-8.4 brn sondy silt mod plastic moist 8.4-8.9 multicolored glass Fragments Sm	heterence Sample		5	
EEPO	5-6	10-12	17/19/ 19/26	ران مو (ن	Black sendy ash occaissionial glass fragmais brown sitty sand without ash in lower of of spoon	ANALYTICAL SAMPLE P9106012	76		
			·	·					

FII	ELD BORING	LOG	Boring No. PBB9
Project No 685303	Project Name BA	}P	Page 2 of 4
Contractor MATH	ES Onner T. C	RANK Date started	(0-13-4) completed (0-13-4)
Method HSA	Casing Size 44"	HNU 11.7/10.2	Protection Level C
Ground El	Soil Drilled 109'	4 below ground	Total Depth ///
Logged by ES	Checked by DR	P Date 10/14/41	

Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Mont	orng
S-7	12-14	12-33- <u>50</u> 3"	_	brown fine sand trace gravel, loose wet, SP	ANALYTICAL . Sample P9106014	HAR AIM ON ON ON	
S-8	14-16	50/50	0.8	yellow tan fine sand trace gravel truce black waste, glass, friable texture moist m part. SP	ANAUTICAL SAMPLE P9106016 5 ppm 4 above cuttings pile	900 BKG	
S-9	16-18	<u>50</u> 5"	0.45 0.	sand similar to above	Reference Samply 170 ppm 2" above cuttings pile	8 %	
S-10	18-20	11/32/ 50/ <u>50</u>	وم م	light brown sand finite to coarse moderately well graded to poorly graded fine sand. areas of slight gray discoloration boose, tr gravel SW/SP	Analytical Samply P9106020	SOO BY	
S- (1)	10-32	14 39V 5"	1.4	brown Sand fine to medium most lad discoloration trace gravel SP	Reference Sample Analytical VOCS taken	8000	

FIELD	BORING	LOG	Boring No. PBB 9106
Project No685303 Project	TAZLS emen to	NAMA BAAP	Page 3 ot 4
Contractor MATHES	Driller T. C.	LANK Date started	10-13-91 completed 10-13-91
Method HSA 414" Casing	Size	HNU 11.7 (10.2)	Protection Level C
Ground El. Soil ()miled 09'	4 below ground	Total Depth ///
Logged by E.S. O	nected by DRP	Date 10/14/41	

Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Mo	nito	rng LEL
S-12	24-26	13/30/ 50 5"	1.4	tan to light brown gravelly sand. Fine to coarse with rounded grower loose 5 w	ANALYTILAL SAMPLE P9106026	Klaar 100		y, wi
S-13		27-37- 40-55	2.0	brown gravelly sand 50% grand. occasioned grayish discoloration 5P/SW	Anadytical Sample P9106031	W50	*	
5-14	3 9-41				50-100 ppm Methylene Chlotha Nondspace ref. yar (draeger two)	! 1		
s-1 4	39-41	9/34/	2.0	brown some 5W Time to coarse with 30% rounded graved loose, maist, grayish descolored accommon	ANAUTICAL SAMPLE P9106041	550	976	
3-15	49-51	3/14/ 29/40	1/8	discolored appearance finer zones produce highest tip readings and appear well brown sand time to medium well sorted frequent thin grayer discolored lamina. Wet oily appearance on grains	Analytical Sample 199106 051	400	a) Ye	
		·		- ▼				

FI	ELD	BORING	LOG		Boring No. 98891
Project No 685303	Project N	ame USATH	AMA	BAAP	Page 4 of 4
Contractor MATHI		Onlier T. CR	ANK	Date started	10-13-91 completed 10-13-91
Method HSA4"	Casing Si	20	HNU 11	7/102)	Protection Level C
Ground El.	Soil Dritte	109'	₹ bei	ow ground	Total Depth ///
Logged by ES	Check	ed by DRP	D:	ne 10/14/91	

S-16 5 3-17 6		38/50 12/22 32/40	0.	sand fine well sorted wents slightly yellowish greenish brown coloration some paper to pencil width huminations, darke graybrown. St sand tan very fine, well sorted several greenish yellow lamina generally drier apparence	ANALYTICAL SAMPLE P9106071	1600,000	AIR	LEL
5-18 7		32/1c	0.0	grand ten very fine, well sorted, several greenish yellow lamina	ANALYTICAL SAMPLE P9106071	100	OX C	
	19-81	50		describe outer ablanced			1	
ו אפו הו		<u>50</u> 5"	,	No recovery	No SAMPLE ROCKY	_	à	
	39-91	4/18/30/	2-9	Gravel loose , rounded with 30% med to coarse sand damp GW tan sand very fine-	P9106091			
S-21 10	01-111	38	N. O	loose, dry expearence	ANALYTICAL SAMPLE P910601 ANALYTICAL SAMPLE		346	
			·	BOB 109' AUSERS 111' Last split spoon	P9106111	Bre	aya	

FIELD	BORING	LOG	Boring No. PBB-91-07
Project No 6857-63 Projec	Name BAAP		Page 01 _4_
Contractor MATHES	Driller Kenty Bay	Date started	16-12-91 completed (5-13-4)
Method HST/(MK 75 Casing		HNU 11.7/102	Protection Level D
Ground EL Soil C	niled 75'	4 below ground Nice	Total Depth PAP 77
Logged by RH1 Ch	ecked by DRP	Date 10/14/91	

.

5:00 5-1 0-2 2/6/5/4 20/ Booken 0.9'-Brown Silty Clay; 14 thin layer of colo, charact and ylass out top; Top 0.9- 1.4-Silty four send, grass; dry. Top 50.1 (CL/SM) Source Sank, Stiff; dry. (CL) 87 86 Bly Course Sank, Stiff; dry. (CL)	· 	Sample	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring HNU LEL	5172.1 522.
(CL) 3-3 4-6 5/15/20/26 2.27 Borton 6.11- Brown from so. 1-6 concert send: some from the medium ground (ES) fill) Top 11-16- Brown 5.114 Clary; chay (Free/CL); trace red Cherons med! Brown from to course some 184 84 84 S-5 8-10 12/45/100 1.47 SAME AS ABOVE Earn 6-2' Analytical By By By 8-26 8-6 10-12 30/100 1.47 SAME AS ABOVE (6 M/FILL) 5:34 5-6 10-12 30/100 1.75 SAME AS ABOVE (6 M/FILL) 5:40 5-6 10-12 30/100 1.75 SAME AS ABOVE (6 M/FILL) 5:41 Analytical By By By By By By By By By By	5: 00				22%	thin layer of cosh, chansel and years out tops; Top out - 1.4-5114y free send, grass.		TAR AIR RK	-
3-3 4-6 5/15/20/26 2-9 Both to - Brown to the both to - Brown to the both to - Brown to the both to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to - Brown to	15:07	5-2	2-4	4 (5/10/11	7.0,	Brown Silty Clay; truck course suck, stiff; day.	_	73% 35 Bly	3kj
5:18 5-4 6 8 21/40/52/ 810 m. to course such Analytical 134 354 14 526 5.26 8-10 12/45/100 1.47 SAME AS ABOUR ERUM 6-2! Analytical 134 134 154 15.34 5-6 10-12 30/100 1.75 314ME AS ABOUR ERUM 6-2! Analytical 134 134 154 154 154 154 154 154 154 154 154 15	?41076 OF		·		ط, ا	consisted; some fine to medium grand (Fill) Top 11-16- Brown Silly Clay; dry (File/Ch).		3ky Blch	
5:34 5-6 10-12 30/100 (GWI/FILL) 5:34 5-6 10-12 30/100 3175 314MK HS HOUR (6WI/FILL) HALY +:CCL BKy BKy 130/100 1175 314MK HS HOUR (6WI/FILL)	15: 18 Notes	s-4	6 8	21/40/52/ 150	2.5	Brown fine to correct sul; little fine to correct rounded granel; dry, fill, and filocon	And the second	13·7 13·7	دو
5:34 5-6 10-12 30/100 2:75 314ME HS HOUR (6 W/FILL) HALY +: CCL BKy BKy				}	1.47	SAME AS ABOUR FRUM 6-4." (Gui/Fill)	Analytical	B14 84 B14	315
		S-6	10-12	30/100		.	italytics.	Bry Br	Bk

FIELD	BORING	LOG		Boring No. 788-9
Project No (8:53-03 Project	Name BAAP			Page 2 ot 4
CONTRCTOR MATHES	Ormer Kenty B.	nicheser Di	ite started /o	-12-91 completed 10-13-91
Method HSA /(ME 75 Casing	Size 4.25"	HNU 11.7/	0.2	Protection Level D
Ground EL Soil Or	med 75'	1 pelow	ground Nace	Total Depth 1986 77'
Logged by 72HH CTH	cked by DRP	Çate	10/14/91	

TIME	Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description Comments on Advance of Boring		Monitoring HNU LEL			₩ ² ζ.λ.
15:44	s-7	12-14	35/40/42/ ₁₆₆		SAMR AS FRUM 10-12' (GW/FILL)	Reforme	TAR BILL	*,	ي اد <u>م</u>	
15. 53 1167016	5-8	14-16	13/22/28/28	2.0/ 2.0	Button 1.4'- Tun finer Sud; little modium sund; true		B _r	Rby.	Bk	lar?
		_			fine to medium sub rounded yound; Top 1.4 - 2.0 - Bown	WATIUR 15			}	-
	5_0	/L_182 ⁽	10/21//		fine to coarse sand; little fine to medium granul; dry (5P/Fice/sw/)					
16:00	2-7	10-10	10/21/21/ 127	20	Ton fine send; some medium soud, truck consessaid; dry	Reference	BY.	Bly	Bij	
- (C-1) P91070Z#	S-18	1 ६-८०	9/11/21/22	2.5/	Tenfine Soul; some medium soud; + me comse soul out fine growel; dry (5P)	Anchytical	B.	የ ት	Βkj	7
(6-17	5-11	20-22	7/19/24/3 ₁	2.9	Tim medium Send; some for send; little course send; trace Fine runded great, propered withough minorals, day. (500)	Reference	₹Y	5 \	۵۴	o.
į								\coprod	·]

FIELD	BORING	LOG	Boring No. 788-91-07						
Project No 6053-03 Project Name BAAP Page 3 of 4									
CONTRCTOR MATHES	Ormer Kint B.	where Date sta	rted /4-12-91 completed 10-13-9/						
Method HSA KME 75 Casing		HNU 11.7/(0.2	Protection Level D						
Ground El. Soil Dr	illed 75'	4 below ground	Done Total Depth Mag 77'						
Logged by RHH Che	cued by DRP	Date 10/14	191						

· _	Sample	Depth in	Blows per	Pen	' Daniel Control	Comments on	Mons	torng	21.5
TIME	No	Feet	6 inches	Rec	Description	Advance of Boring	HNU		5/2
16:25	S-12	27-74	16/46/6/50	2.0/	Ton medium sul; some coarse sund fine to coarse grand; dry (SW)	Reference	TAR ATI	15 lco	34,
16:35 HOTOZE	5-13	 29-26	248/w/ 45	2.4	truce course and and fine to course angular to	Analytical	8-7 84 ³	Bly	Bk)
16:50	s-14	ZC- ZF	7/27/54 50	2.ey i.7	SAME AS ABOUR FAM 24-26', dry. (SW)	Reference	7 ³ 4-13	改	នេះ
ن ^{ون (} 7 ا	5-15	28-3 0	7/24/22/46	2.0	Bottom O.Y'- Ton fine Send. trace medium send, Top' U.Y- 2.0'- Tun medium	Peterone	改	Bk _/	₿ĸ
17:06	5-16	3v-3Z	(& so so (&	2.4	Sind; some fine and corse send; trace fine to course surenjular grand; dry- (5P/SW) The medium send; little fine send and course send; trace fine to coarse sub-randed, record and rock from the fine of surely experced with Chemyminum is; dry- (5W).	Analytical	以		18 k _z

FIELD	BORING	LOG	Boring No. PBB-91-07						
Project No 68:53-03 Project Name BAAP Page 4 of 4									
CONTRCTOR MATHES	Ormer Keith B.	ascharger Date started	10-17-91 completed 10-13-91						
Methos HSA/LME 75 Casing			Protection Level D						
Ground EL Soil Dr	Hed 75'		Total Depth PBO 77'						
Logged by RILL Che	cted by DRP	Date 10/14/91							

	Sample	Depth in	Blows per	Pen	· B	Comments on	Mo	nito	rng	1: 11
TIME	No	Feet	6 inches	Rec	Description	Advance of Boring	HN		LEL	\$
17:24 Psun42	S-17	40-42	24942/54	24	Ton medium Sul; little fine sul; trace rourse scul cut for so medium sub rundium sub rundium inche fragments; dry, perpre with H.M. (SP)	Analytical	GAR.		3+1-	. ,
c8:30 P9167052	S- 18		25/52/54/5g	2.0	Jo-13-9/ The medium Sind ! little fine sent ; trace wersor sente will fine runned ground paid Hon; dig (SP)	Analytical	В	^라)	المالة	RL)
7910706			22/35/43/ /50		End, fine runnient your		19 3	Bkj	ßkj	T)
	1	76-77 75-77 80-80			The fine Simb; true modium simb course simb; dry. (SP) The fine to course Simb; some	Anoxytical colles of 73' Augus refused of 75'		ፍ ኮ ፓ	Sr.7	e _
10.20 ES				, 'S	free or coerse grand and rock frequents (seedsome; getland) dry, (GW)	T.D. TEL,	BJ	134	الله الله	:,

FIELD BO	ORING	LOG					BOF	RING N	10. PZ	13-9	9-31
ECT NO.: 6	1290 -11	PROJECT	NAME:	USATHAMA- BA	ap FS				PAGE	/ (2 2
BITLLING CONTRACTOR: LAYNE SOUTHWEST DRILLER: GRadricuez DATE STARTED 8/22/90 COMPLETED 8/23/50											
METHOD: DUAL WALL CASING SIZE: 9 IN. TIP ev: 75 2 PROTECTION LEVEL: D											
XINO ELEV.:		SOIL DRILLED:			R LEVEL:	NA		TOTAL DE	PTH: 10.	1.5	
COED SY: [7033	CHEC	XXED 8Y:	P Bolar		DATE: 9/3	5/90	·			
		<i>,</i> '								Tip= 0	./-0.3.
	EPTH IN PRET	BLOWS PER 6-INCHES	PEN. REC.	•	DESCR	IPTICH			ABYANCE O	ITS ON OF BORING	TIP L
410	7.5	³ 57	K"	black of					Fill		blgd
S#2 5-	-6.5	7,4,8	17"	Tan Sine lightbrn b gabbvoc Social crse at sitt hall	sitty S Med 5n notten)	and 600 Sand 6 st 6.5 at at 6	-6.5 .5.7	.5	S:11		bkgd
1 3 0	-11.5	17 27 22	13 [*] /	crse and sitt hall: crse graded - snow with snow likely sill	red 10- reve	90202 10.5 Sand 10 Il 11-11.	l at 6 いろ-11 ち	5.331			Lkgd
15	-16.5	7 20 28	17"	crse-mosand +	ed SAA Crse e. burd	D with grave torans	som	e5n ne nterial	., 5ill change	,	lokgd
*5 29	, -2 95	4/8/18	13"	Ten Me sand i some p materia	- niNaV	e, v.a	Carl	1			Bleg d
*6 25	; -26S	6 ₁₅ 25		Tan m crse Si stratise	ind 20	ne at	- 26	st.			

S=8 70-7/5 13/35 S=8 70-7/5 13/35 S=8 70-7/5 13/35 S=8 70-7/5 13/35 S=8 70-7/5 13/35 Coarse Gravel with Medio Cree SAND. (SP-GP)											
RETINDS: DRIAL WALL CASING SIZE: 9 NL TIP OFFT # 12 PROTECTION LEVEL: D CHECKED SY: SOIL DRILLED: 101,5 WATER LEVEL: N/A TOTAL DEPTH: 101,5 LOGGED SY: T BINSS CHECKED SY: DESCRIPTION BLOWS PER PEN DESCRIPTION BLOW PER PEN DESCRIPTION BLOW PER PEN DESCRIPTION COSMENTS ON ADVANCE OF BORING TIP SAFT 45-4655 18 Tan Med. S. SAND IT OFFT VOA, SNOW (SP) COAVSE QUALIFICATION COSMENTS ON ADVANCE OF BORING TIP COSMENTS ON ADVANCE OF BORING TIP COSMENTS ON ADVANCE OF BORING TIP COSMENTS ON ADVANCE OF BORING TIP COSMENTS ON ADVANCE OF BORING TIP COSMENTS ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING COSMENTS ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING TO SAFT SINCH STORES ON ADVANCE OF BORING T	2										
EXCLUDE ELEV.: SOIL DRILLED: 101.5 WATER LEVEL: NAT TOTAL DEPTH: 101.5 LOGGED BY: TBINSS CHECKED BY: PEN. DATE: 9/35/50 SAMPLE DEPTH IN BLOWS PER PEN. DESCRIPTION DATE: 9/35/50 SAMPLE DEPTH IN BLOWS PER PEN. DESCRIPTION DATE: 9/35/50 SAMPLE DEPTH IN BLOWS PER PEN. DESCRIPTION DATE: 9/35/50 SAMPLE DEPTH IN BLOWS PER PEN. DESCRIPTION DATE: 9/35/50 SAMPLE DEPTH IN BLOWS PER PEN. DESCRIPTION DATE: 9/35/50 SAMPLE DEPTH IN BLOWS PER PEN. DESCRIPTION DATE: 9/35/50 TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF BORING TIP DATE: 9/35/50 SAMPLE OF	المردو										
EMPLE DEPTH IN BLOME PER OF HEN. STATE DESCRIPTION BELOW PER OF HOLING BEC. DESCRIPTION DESCRIPTION ADVANCE OF BORING TIP STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE											
SHOLE DEPTH IN BLOWS PER 4-INCHES REC. DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION ADVANCE OF BORING TIP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP S	}										
SHOLE DEPTH IN BLOWS PER 4-INCHES REC. DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION ADVANCE OF BORING TIP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP SHOP S	DATE: 9/25/90										
S=8 70-7/5 13/35 S=8 70-7/5 13/35 S=8 70-7/5 13/35 S=8 70-7/5 13/35 Coarse Gravel with Med-o Cree SAND. (SP-GP) Coarse SAND. (SP-GP)											
S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70-7/5 1335 S=8 70	ITCRING										
S=8 70 71.5 13/35/25 18" coarse Grave with Melto Crse SAND. (SP-GP)	LEL										
S+8 70=7/5 1335 18" Coarse Grave with Med-6 crse SAND. (SP-GP)											
S#9 85-86.5 \$15, 18" Tan med-5n SAND wt evse sand at 85 and 86-86.5 st (SP) Moist. Wet at 100 5t.											
5*10 100-195 367 18" Tan crose-fn SAND+ 10" Sine grave SP.											

FIELC	BORING	LOG			BORING I	NO. 733-98	2-02
110).: 6296 -11	PROJECT	MANE:	USATHAMA- BAAP FS		PAGE / O	12
lame o	CONTRACTOR: LAY	NE SOUTHWES	r		ATE STARTED		TED \$/73/98
THOD: DI	HAL WALL	CASING SIZE: 9		TIP W: TE #2		ON LEVEL: D	
ano er		SOIL ORILLED:	96.	5 WATER LEVEL: 1973	TOTAL DE	PTN: 96,5'	
GOED BY:	JBus	Z CHEC	או פונא	: P Bolow DATE: 9	1)5/00		
	~	TE	Ž	3kgd= 0.0-0.3	DOM		
aple Ng.	PERT	SLOWS PER 6-INCHES	PEI.	DESCRIPTION		COMMENTS ON AGVANCE OF BORING	HONITORIN
*/	0-1.5	48	18	black topsoil over sift - Clay with little asphatt-like wast	black	:	bkg.
12	5-6.5	31015	18	1 /	leaner Lanste	J NO WASTE	bkg.
Ç	10-115	13 5%	8.	Some grave at Sn-crose SAND quave some red. sitty In SAND, as	5-5.55%	5.//	6K4.Y
3 * 5∕	15-16.5	51421	18/18	clean med SAND 19 crse SAND + grav some dark brown possible mat. 801	5-16-54 rel 16-16.5 streaks	Native Soil.	6/5
*5	20-215	5,4/8	17	In grave stratify	AND 25		bkg J
5*6	25-25	5/13/20	18:	Tan med In SI trace Croe SHNI + sitt.	AND D, graves GR		6kgv

BORING NO. 753-90-02 FIELD BORING LOG PROJECT NAME: USATHAMA- BAAP FS PAGE PROJECT NO.: 6298-11 DRILLER: G Ralvigues DRILLING CONTRACTOR: LAYNE SOUTHWEST TIP d: TE =2 PROTECTION LEVEL: CASING SIZE: 9 ML HETHOD: DUAL WALL SOIL DRILLED: 96.5 WATER LEVEL: ~9 7.54 TOTAL DEPTH: 96.5 GROUNG ELEV .: DATE: 9/25/90 CHECKED BY: SAPPLE NO STREMENTS DEPTH IN BLOWS PER MONITORING 4- INCHES ADVANCE OF BORING PERT DESCRIPTION REC. TIP LEL S#7 45-455,320 18- Stratisted Med Sn SAND bkg with occasional crose sand moist Victer bedding erse gravel cobble zone at 60 to 655t. S#8 65-66.515,7 18 bks. 180 Some gabbro SP-GF erse gravel cobble zon 8 Jan Med In SAND. Nos. H Truce grave moist to V. moist coarser math. S#9 85-85 645 95-8.5 3 at 85-85.55+ (SP) 18" Tan Med-crse SANDENT = 955% some grave! (SD) 9551 BOE

FIEL	D BORING	GLOG		BORIN	G NO. PBB890	1	
RCJECT N	0.: 5753-	PROJECT	MAME: U	ISATHANA- BAAP	PAGE / C	73-	_
RILLING	CONTRACTOR: L	AYNE-WCRTHLEST	1:	Part Date STARTED	1/22/89 COMPLE	7/2	3/5
ETHCD:	15A	CASING SIZE:		10 TEP eV:-# 7 PRCT	ECTION LEVEL: C Deri	met	
RCUNO EL	ev.: 875.5	' SCIL DRILLED:	107		1201 : K163C 7		
	: PLB			STO. CATE: 2/27/89			
SAMPLE	NI NTESO	BLOWS PER	PEN.		COMMENTS ON	MCN!	: ca :
NC.	FEET:	6-{NCHE3	RES.	OESCRIPTION	ACYANCE OF BORING	TIP	.:
5-1	0-2'	50-47-18-20	70/16	04 organics .4-16 Ok Ten clay, moderably plackic, stiff damp (CC)	Ref Mastic linewat	Bkg	
5-2 •	2.4	14-12-10-10	2.9	Bl silty clay, moderately plastic, firm damp (CL)	Ref	Skg	
3-3	4-6	2-4-6-9	20/12	ox brown to bl clay, little cilt, plad 56th, damp, w/some charrod layors	ric Took Analytical	Bks	
5-4	6-8'		11	DK dive clay, w/trsill (CH) To Fi to and sa, moderately plactic Firm, damp	Y24	Bks	
-5	8-10°	D-58-94-19	1.5	Ten or b/some med sa, well grade loose dry (GW)	from closgrad shoo refrage @ 8.0'	Sk5	
5-6	10-12	90-193	9	Ten or w/ some med to fi sq we graded, dense, dry (GW)	Cobble zone 2 11	BKg	
5-7	12-14	20 -112. 138		Ten med to Fi sa, Tr c, w/ little -e Fi gr, Tr c gr, poorly graded, very dense, diy (Sp)	Took Analytical	Bry	<u></u>
8	14-16	<u>100</u>	3	Ten c b fi gr w/ 1.44 med to fi sa, poorly grand, donec, da=7 (69)	Rel-also Taken on 1/23 in affect boring	Brz	

FIEL	BORING	LOG		BORING	NO. PBB89	01
PROJECT NO	D.: 5753-08	PROJECT	чаме:	USATHAMA- BAAP	PAGE 2	· 3
ORILLING	CONTRACTOR: LAY	YNE-YCRIHUEST	1	DATE STATED	1/22/89 COMPLE	. (19.010)
METHCO:	HSA-	CASING SIZE:	4.7	15" 10 TIP ev: -# 10 PRCTE	TION LEVEL: C DECK	nal
GROUND ELS	875.5	'ESCIL DRILLED:	10		1501 :HTE30	
LCGGED 3Y	AB.	CHEC	YE CEX	: 80. 2 21 89 DATE:		
SAMPLE NC.	NI KTESO TESS	BLOWS PER 6-INCHES	REC.	- DESCRIPTION	COMMENTS ON ADVANCE OF BOX:NG	MCNITORING
5-9	16-18	32. 100	, -	As above	Took Analytical	Bkg
5-10	18-20	0.3	}	No recovery - rock classed in shoe	Notakenon 1/23 in offert boring	
5-11	20. 22	27	0.1	Tan med to Fi sa, w/ some Fi 5, Tr c gr, poorly gradel, dance dry (SP)	Ref	Bkg
5-12	·	100		No recovery	Ref	Bks
5-13	30-32			(saidstore)		
5-14	31-33	24-39- <i>44-90</i> ·	1.8	len greedy sa, med le fi sa, w/title Fi ex and some egr, conjust poorly graded, nout (51)	Jook Azeltial spean opperiello be a good opperiello of the actual little	- WOY
5-15	40-42	12-23-34-2	20 17	Tan, medistisa, Trc, Trfi grand Trcgr, poorly graded, compact, moist, somestratification (SP)	Took Analytical	BK
5-16	50 - 57	15-33-48-58	29.	I am most to Fi sa, poorly graded, compact, moist. 5 Course sa leus	Took Analytic	I BK

FIELD BORING	LOG			BORING NO). PBB8401	
PROJECT NO.: 5753- 0 8	PROJECT NAME:	USATHAMA- BAA	NP.		PAGE 3 OF 3	
DRILLING CONTRACTOR: LAY	NE-NORTHWEST	DRILLER: R	doer Pare	DATE STARTED 1/2	2 89 COMPLETED // 32/89	7
METHOD: HSA	CASING SIZE: 4		TIP ev: 10	PROTECTION	LEVEL: C Oermal	
GROUND ELEV .: 875.5	SOIL DRILLED: 16	21 WATER	LEVEL:	TOTAL DEPTH		
LOGGED BY: RB	CHECKED BY	1: 880. 21	TT(89 DATE:			i

SAMPLE	DEPTH IN	BLOWS PER	PEN.		COMMENTS ON	MONI	TORING
NO.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
5-17	60-62	24.36.36.41	20	Tax med to Fisa, Tr c, Tr Figr, poorly graded, damp, compett 0.8 courses lens SP	Took Analytical	BKS	
5-18	70.72	13.75-193	13.	SAND, TAN, F TO 13 PD C, F TO C GENEL CONTACT AT 1.0;	ANALYTICAL	BKG	
	60 -87	33-77-91- <i>8</i> 8	7.0	W langrowthy sa, F: tomed Sense with title Figrand some	COBBLE ZONE FROM 72 TU 78 FEET. Took Analytical	Bhq	
5 - 20	90 - 92	19-75-95 ¹ 3		c gr, very dease, damp, well graded (Till)(SW) 0-Ll Tan Fi board sa, a peorly graded, compet, damp(Sp) 1.1-16 Okton gravely cons, Fi to med sa, title c sa, w/Fi To c gr, well graded, very deven	ag' sc. 011	g ⁱ kg	
5-21	100-107	34-3 4-3 €		Ten (penid colors) grouply se, Fi to med se, Tr Fi, of little Fi grand some e gr, compect damp to saturated at bottom of span (SW)	Took Analytical used 1700 gal	Bkg	

FIELD BORING	LOG	BORING NO. PBB8902
PROJECT NO.: 5753-	PROJECT NAME: USATHAMA - BAAP	PAGE / OF 4
DRILLING CONTRACTOR: LAY	THE-NORTHWEST DRILLER: Rooms Part	DATE STARTED //24/89 COMPLETED 1/25/89
метно: Н5Д	CASING SIZE: 425"10 TIP ev:	10 PROTECTION LEVEL: C Devrice
GROUND ELEV .: .873.8	SOIL DRILLED: 105' WATER LEVEL: 1	00'± TOTAL DEPTH: 105'
LOGGED BY: DLB	CHECKED BY: 7 2 27 89 DATE:	

***	BLOWS PER	COMMENTS ON	MONITORIN			
FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
0-2'	30-50-31-A	7.5	plashio, Stiff (Frozen) w/orsanics-	.85 - pladic liner Ref (fill)	Bkg	
2-4'	20 -20 -15-15	برائع الم	plastic, Stiff, some Charbon places	(fill)	Bkg	
4-6	10-38-16-10	तुष्ठ ठ	silty cley - BK clay w/ little silt, moderally plastic, stiff temp -	Anal (F:11)	B.143.	
6-8'	10 14-12-12-12 190	2.0 0.1	Sand - BK F: to mod sa , tith	Anal-wot and script to work with (Fin)	4.8	
8-16	11-193	0.8 2.05 0.8	B Acabase W/ meanine	Anal	2.&	
	2-4' 4-6'	2-4' 20-20-15-15 4-6' 10-38-16-10 6-8' 11-159-	2-4' 20-20-18-15 20 20.3 4-6' 10-38-16-10 20.3 6-8' 10-12-12-12-20.3 8-16 11-199-20-18-15	2-4 30-50-39-22 2.5 Clay 5. Ok br sity clay (Fill) made place to , 5 till (Frozen) w/organics places of still (Frozen) w/organics places of still, some charved places. 2-4 20-20-15-15 20 0-10-Clay-Dk oline moderately places. Place to , 5till, some charved (24) precess 10-20-51-15 20 10-20-15-15 20 10-20-15-15 20 10-20-15-15 20 10-20-15-15 20 10-20-15-15 20 10-20-15-15 20 10-20-15-15 20 10-20-15-15 20 10-20-15-15 20 10-20-15-15 20 10-20-15-15 20 10-20-15-15 20 10-20-15-15 20 10-20-15-15 20 10-20-15-15 20 10-20-15-15 20 10-20-15-15 20 10-20-15-15 20 10-20-15-15 20 10-20-15-15 20 10-20-20-15-15-15 10-20-20-15-15-15-15-15-15-15-15-15-15-15-15-15-	2-4 30-50-38-22 20 Clay 85-01x br sitty clay (Fill) mod like of O-yes-on br sitty clay (Fill) mod like of O-yes-on bridge of aire great and some charced pleatic, 5tiff, some charced papers (Gill) 2-4 20-15-15 20 0-L0-Clay-Dk olive moderated (Hill) 2-4 20-15-15 20 0-L0-Clay-Dk olive moderated (Hill) 10-20-51-15-15 20 0-L0-Clay-Dk olive moderated (Hill) Pleatic, 5tiff, some charced (OH)(CC) Pleatic, 5tiff cand now charced (OH)(CC) Pleatic, 5tiff cand pleated, (SM) 10-38-16-to 08 Silty clay-Bk clay w/ little silt, moderated pleated, 5tiff damp- (Fill) 4-6 10-38-16-to 08 Silty clay-Bk clay w/ little silt, moderated pleated, loose, damp moderated preces at the shoe (Fill) 6-8 10-12-12-12 20 Sand - Bk Fitomed So, tittle mud. Somple to whork with (Fill) 8-10 11-150 As above w/ near the charce in sheet with (Fill)	2-4' 20-36-36-22 20 Cley 5-0k br sitty clay (Fill) mod like for place his, 5 the (Frozen) w/organization charced places prairie graine graine and some charced frequency plantic, 5the, 5the, 5the clay moderately (Fill) 2-4' 20-20-15-15 20 0-10-Clay-Dk oling moderately (Linguistra) Plantic, 5the find some charried (24)(CC) Prices 10-20-15-15 20 10-20-15-15 20 Fig. his, 5the find some charried (24)(CC) Prices 10-20-15-15 20 Silty/cant, oline them (5M) Fill) Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fill Fil

FIELD BORING	IELD BORING LOG					BORING NO. PBB-902				
PROJECT NO.: 5753-	PROJECT NAME:	USATHAMA- BAAP			PAGE	2 OF 4				
PRILLING CONTRACTOR: LAY	HE-HORTHWEST	DRILLER: Rodue	ferr	DATE STARTED //	24/89	COMPLETED //	25/89			
нетноо: H S Y}	CASING SIZE: 4.2		ev: # 10	PROTECT	ION LEVEL: C	Dermal				
ROUND ELEV.: 873.8			EL: 100	D'± TOTAL D	EPTH: 105	۷				
OGGED BY: PLB	- CHECKED B	1:958 2/2	DATE:							

I

SAMPLE	DEPTH IN	BLCWS PER	PEN.		COMMENTS ON	MONT	TCRING
NO.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
5-6	16-12	98.39	0.7	Sand DKbr Fitomed Sa Some C, will graded, conput, deep (SW)	Anal (F:11)	BKG	
5-7	12-14	48-160-25	1.4	Soul Oktan med to Fisc, Tre, Tr Figr, tregr, poorly graded, douse, damp (50)	Ref	Bkg	
5-8	14-16	60-67-54-4	20	Sand Ton C+ Fi sa little Very Fisappoorly gooded, dense, damp. (54)	214.2 bother, of pit Change Auch Oktan	Bkg e.14.	2.°
s- 9	16-18]}-39-38-5 0	2.0 2.0	Sand Tax F: tovery F: sa, Tr C, poorly graded, computed. dense, damp, s. 11 partingo. 1-0.4 (SP)	Anel-BNA		
1 .	18-20	19-3135-33	3.0 3.0	LAYERED SILT AND SAND TO SILT, NONPLASTIC, LT BROWN SILT W/ FINE SAND, TR M-C TO A FIRM SILT, DAMP, CONTACT AT 1-5 SP/ML	NAM	3.0	
5-11	25-27	14-26-71-4	7 20	SAUD, TAN PHRADED VERY FINE TO TR HEO SA, O.2 C SA - FERV LAYER, OCCASSIONAL SILT PARTILLES COMPACT, DAMP SP	ANALYTICAL	0.8	

FIELD BORING LOG PROJECT NO.: 5753- OF PROJECT NAME: USATHAMA- BAAP DRILLING CONTRACTOR: LAYNE-NORTHWEST DRILLER: RODMY Page 3 OF 4 DRILLER: RODMY Page 3 OF 4 DRILLER: RODMY Page 3 OF 4 DRILLER: RODMY Page 3 OF 4 DRILLER: RODMY Page 3 OF 4 DRILLER: RODMY Page 3 OF 4 DRILLER: RODMY Page 3 OF 4 DRILLER: RODMY Page 3 OF 4 DRILLER: DATE STARTED 1/24/84 COMPLETED/25/89 DRICCION LEVEL: C Demail LOGGED BY: PLB | CHECKED BY: PLB | DATE:

SAMPLE NO.	DEPTH IN	SLCUS PER	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MCNI	TORING
			REC.		ADVANCE OF BERING	TIP	LEL
5-12	30-32	25.36-60r -67	20	Some a well graded, dense to they dance damp (SW)	Took Anat	12	
			2/19	.6-1.4/ med to fi su, poorly graded, dense to very dense, damp 1.4-17- as p6 (5P) Sound Town med to F; say Tr an, Tr F; gr, parry graded, dense, damp, well stratified up sill partings throughout (5P)	Took Aml	1.3	
5-14	50-52	21 ·4 5-66- 74	3.5	Send ned to Fisa Tre pool, graded, done to very donse, day, day, stratified (SP)	Augl		
,	60-62'	ૐ-મકગ ૧- ક્રિક	20 1.9	Sound med to Fi sa, tr c, poorly 5reded, very dense, damp, well stratified, ared sand louset 1.5	Anal	Bkg	
S-16	76-72	42-72 -16	1.8	Gravelly Sand, need b Fi say l Tr c say by some Fi to a gravil word some graded, very done, down (GP)	Charge 70.0	0.8	

FIELD BORING	LOG			BORING NO	.PBB8902
PROJECT NO.: 5753- ⊘\$	ING CONTRACTOR: LAYNE-NORTHWEST DRILLER: POWER POWER DATE STARTED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED 1/21 COMPLETED		PAGE 4 OF 4		
DRILLING CONTRACTOR: LAYN	E-NORTHWEST	ORILLER:	du Par	DATE STARTED 1/2	L) COMPLETED 1/25/89
нетноо: Н 5у4	CASING SIZE: 4/. 2	5" 10	TIP ev: 44/0	PROTECTION	LEVEL: C Dermal
GROUND ELEV .: 873.8				TOTAL DEPTH	: /০১ '
LOGGED BY: PLB	CHECKED 8	r: 2/27/89	DATE:		

SAMPLE			COMMENTS ON	MONITOR			
NO.	FEET	2-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
3-17	80-83	37-61-92- 100 0.4	1.9	sine c very well graded, confirm	Analytical	1.8	
5-18	90 -92'	38.47.73 100 04	19	As above	ReC	Bis Bis	-
-19	100-102	11-19-11-19	<u>3.D</u> 1.0	As above but salunded	Hena!	BK	
				BOB @ 105'	·		
					·	,	
	-	•					
	•			-			
						:	

בובו ר	BORING	100			BORING I	NO. PBB89	-03	
): 5753- 0%		MAME:	USATHAMA- BAAP			F 4	
	CONTRACTOR: LAY		T		TE STARTED	31/89 COMPLE		164
METHOD:		CASING SIZE:	<u> </u>	TIP'ev: 15		ion level: C Den		1
GROUND ELE		SOIL DRILLED:			TOTAL DE		174	
LOGGED BY:			KED BY					
	1-0				PKaron	d=42		82 H
SAMPLE NO.	DEPTH IN	SLOWS PER 6-INCHES	PEN.	DESCRIPTION		COMMENTS ON ADVANCE OF BORING	IKOM	TCRING
5-1	0-2'	14-35-12-15	70 1.5	moist, some Charried layer	tiff, maderally	0.5 - Plastic linear Clay 190 cap	Bks	C.2
5-2	2-4'	18-30-32-	294	Simila 109-1 of a s Silly clay - OK dim to b stiff, most, maderally ned to a sa lens at a	plestic, 0.8-1.0	, lef	BKG	
5-3	4-6'	44-5-20	2020	1.9-20 lan clay 100 %	Fill Fill it, plastic cifcr)	Took Andylicid Change & 4.9 from organ Clay to Clay	Bles	0.7
5-4	6-8'	2-5-8-12	30	Ten clay , Tr s. 11, ples moist	tic, soft, CL, Fill)	Ref	Bkg	0.7
5-5	8-10	7-33-74	1.2	02.2 as above .2-62 DKTon growthy med to Fi Sa some Fig C gr, moist, ploorly gra	sandy Sedploase (39 [-ill)	Ref Change @ 8.2' to grandy 54	Bez	

IELD BORING	LOG	BORING NO. PBB-8903			
PROJECT NO.: 5753- 68	PROJECT NAME:	AAE -AMAKTARU	IP .	PAGE 2 CF 4/	
DRILLING CONTRACTOR: LAY	NE-NORTHWEST	DRILLER: A.	dnew Pair	DATE STARTED 1/3/89 COMPLETED 2/1/89	
HETHOD: HSA	CASING SIZE: 4, 25	10	TIP ev: 12 15	PROTECTION LEVEL: C DETAG	
GROUND ELEV.: 868.2"	SOIL DRILLED: /cc	" WATER	LEVEL:	TOTAL DEPTH: /001	
LOGGED BY: PL 6	- CHECKED BY	Sof z	27 39 DATE:		
~		_			

							BIR
NO.	DEPTH IN	BLCHS PER 6-INCHES	PEN. REC.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	TIP	LEL
5-6	16 -12'	46-92-98-	20	similar to 8-5' but well. graded (sw fill)	Took Analyh	-1 15kg	0,3
5-7		25-40-30 33		0.8 as above 08-20 Ten med to Fi sa, Iv very Fi sa, Irc, poorly graded, damp, compact (sp ?!)	Ref	BKg	0.2
5-8	14-16	 2-14-40-3 5	<u> 20</u>	Tan head to Fi see, Tre, Tregr, poorly graded, conject to dough, days, c se bue at .9 (50)	Analytici 1 Network 219.59 BNA	1.2	6,3
5-9	16-18	14-21-46-47	J.D		Analytical (Netwi) NAM	By	۵، ک
5-10		12-25-32-26		straticistica (SP)	Analytical	Bks	0.2
	20-27	15-25-70-57	<u>20</u> 1.5	05 Ten med to Fi sa, u/ some c, well graded, comput, most .5-1.0-2 inver to 5-10 1.0-1.5 Ten med to Fi send, u/some c, Tr L gr, down (Sp)	Analytical	BKs	0.2

FIELD	BORING	LOG					BOR	ING N	o.		-0
ROJECT HO).: 5753- 68	PROJECT		USATHAMA- BA					PAGE 3	OF 4	
RILLING C	ONTRACTOR: LAY			DRILLER: Re	odney far		TE START	1/5		COMPLETED O	41/89
ETHOD:	HSA.	CASING SIZE: 4	las"	10	TIP ev:	±15	P	ROTECTION	LEVEL:	Dermal	
GROUND ELE	v.: <68.7	SOIL DRILLED:	100	' HATI	ER LEVEL:		T	OTAL DEPT	H: 100'		
LOGGED BY:			KED BY:		27/19/0	ATE:					
											PI
SAMPLE NO.	DEPTH IN	BLOWS PER 6-INCHES	PEN.		DESCRI	PTICN			COMMENTS (NITCRING
	1661	O INCHES	REC.							TIP	LEL
5-12	22-24'	16-30-51-41	2/7	Ten med danse, de	Hofiso	e, poorl gr lens	y grad s at ((SP)	A, (Nef	BK	o
5-13	24-26'	15-20-57 100 -4	19	Okton C sa, we C gr, ca	med be	Fi sa	, suct for T moints	(w)	tralytris	Die	0,7
5-14	26-25'	go, 40-53-55	3.0	As al	oale		; 		Ref	BK	0.0
5-15	28-30	15-37-10-51	20	Tem se Lgr, po Strolili	ed, med orly gred vel, mast	to Fi	Tre; pect, w (SP)	trut	Ref	(ý.	5 0,2
Az184 S-14	36-32	12:65-12-95	<u> 2.0</u> 1.6	As abou + dense	e, but we	es wel	x sheek	fied	Inolytic	1 04	0.7
5.17	46-42	30·St-6e-50	2.0 2.0	Ten mi dense, a C sa ka	ed lo Fi desp u B.8	sa, poo	rlygra P)	del	halytria	1 84.	0,
						-					

IELD BORING LOG		BORING NO. PBG8 \$03			
NOJECT NO.: 5753-08 PROJECT	T NAME: USATHAMA- BAAP	PAGE 4/ OF 4/			
RILLING CONTRACTOR: LAYNE-NORTHWEST	1,000,001442	DATE STARTED //31/89 COMPLETED 2/1/84			
ETHOO: AS A CASING SIZE:		PROTECTION LEVEL: C Derma			
ROUND ELEV .: . 868.2" SOIL DRILLE	D: 100' WATER LEVEL:	TOTAL DEPTH: /80'			
OGGED BY: PLB . CHI	ECKED BY: 7 2/27 89 DATE:				
•		PI He			

SAMPLE	DEPTH IN	BLOWS PER	PEN.	AFFCBIOTION .	COMMENTS ON	MONITCRIN		
NC.	PEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL	
5-18	50-52	3444 <i>43</i> -75	3.0	Ton med to Fi sa, poorly graded, dance, damp, c sa lens at .89 (50)	change @ 2 46' to broch sand Took Analytical	BAS	C,Z	
5-19	60-62	29-31-34-60	2.0	As above, but well stratified	Took Andyfirel	ßks	٥،٧	
5-20	76-72	&3:32- <i>5</i> 2- <i>4</i> 9	2.6	07 OK brown scudy, grewd, med to F: sa, Tr &; Fi to & gr poorly graded, donse, damp (ap) .7-13 14 to to 14 gray, Fi to med sa, tr c sa, tr Fi gr, well graded, unter rock dust, donse, day (SW)	Analytical Change e 2 78' Moon	ys.	0,4	
<u></u> 5-21	50.52	33.56 .5 5 •73	20	Oktum to brown, med to fi sa, some e, very well geodech, dense demp (SW)	Asulytrail	BKs	0.5	
5-22	90-92'	35-75 · 1 <u>99</u>	190	05 as above .5-1.0 inc in c, wellgraded, dense lovery danse, schwald BOB C DO	Analytail	Big	5.0	

EIEI O	BOONIC	100	 .			BO	RING N	10 0=	ZR _ 9		
FIELD BORING LOG PROJECT NO.: 5753- 0 8 PROJECT NAME: USATHAMA- BAAP PAGE OF 5											
	ONTRACTOR: LAY		TARIE.		DNEY TA	DATE ST	LRTED 2 -			TED 2	4-85
					TIP ev:						0 0 1
METHOD: Hok CASING SIZE: 4.5 GROUND ELEV.: 972.6 SOIL DRILLED: 10								EPTH: 100'			
LOGGED BY:		LIPLE CHECK				•	1.0.20	70			
COGGED 41.	1. 200	7/PUB CIRCU		.874	00/8	<u> </u>		<u> </u>	<u> </u>	-da.7 -	
SAMPLE	DEPTH IN	BLOWS PER	PEN.				T	Backgrounder PIH. COMMENTS ON MONITORING			
NO. FEET 6-INCHES			REC	DESCRIPTION				ADVANCE O	F BORING	TIP	+64-
5-1	0'-2'	25-68-50-29	2013		d ct.ff		Eli	ref. probab. da	y cho	Phy	.2
5-2	2'-4'	13-13-12-7	2)3	0-1.3 Pc mod. fle	Brown - Ol	IVE 5,14	Class	0-16		Blag	ب کــــا
5-3	•	1		F.ac	-FI SAMC 95 The brown Brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown The brown T		•			Ska	0.2
5-4		42-84-100 for 4		Dense, 1	lamp (G	p)(Gryil	rounded,	refere	rce	Bhj	0.2
G-5	8-10	(8-91-75-100 F	1.9	FIRE 5A	del ultring lens en (GW)-16	ence, down	9	refere	iro	Bhs	6.2
ا ت	10 10	56-32-45-37	7.0	0-2.0 S Fine-V	ame as Al	ns & 1.9	-2.0	Analy	heat	3/2	0.2
1	12:14	13-20-22-30	119	o-l-9 trace co	Dk. tan formand, much out spoon	poorly grad	w/ lock	change fine so (0 12	Fo ands		0.0

						· · · · · · · · · · · · · · · · · · ·							1
IEL	D BORING	LOG					BOF	RING	NO. PBI	3.89	04		
PROJECT	NO.: 5753-08	PROJECT I				. — 			PAGE 2		f 5		
DRILLIM	CONTRACTOR: LAY	NE-NORTHWEST		DRILLER:	Rogney Pc	دبر اه	ATE STAR	<u> </u>	2/84		TED 2-	6-89	
METHOD:	ASA	CASING SIZE:	42	510	TIP eV:	#15		PROTECT	ON LEVEL: C	- Derv	ral		
	ELEV.: 872.6	SOIL DRILLED:			WATER LEVEL:			TOTAL DE	PTH: 10	0'			
LOGGED !	14: 64 pc /ce	NFQ CHEC	KED BY:	श्रिक	2/27/89	DATE:							بر
	T										?	I Had	
SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6-INCHES	PEN. REC.			RIPTION			COMMENT ADVANCE OF		MONIT	TOR ING	
5-8	· ·	₁ e-22-21-3		(/ /	ens encour	stered o		~1.]]	Analy	hal	Bles	0.2	
5-9	16'-18'	19-48-33-21	10	sand c-sa Medi	s Same s Lt Bro d well gro and w/ 1 um Dense ell graded	aded w	gravel	()	refere change grandly & 16.	force to sand 3'	Bkg	0.2	
5-10	1 18'-20'	23-70-52-47		0-1.4 Sand, C-50. W/H Dass 1.4-	LI. B. when fine of the concerning fine fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine of the concerning fine	samel, GN 1 sand 15e, da	ren i		refere from of layer be	20.5 sand	Bleg	0.2	
5-11		17-58-60-100	1.7	offrace den osoli med and to	purly grown or y graced 6. Dk. Br. -f coarse well-gracea 1. In coarse	sand, the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of	relly lense, in the second	a corre	Araly	tical	Blag	0.2	
5-12	22 - 24'	21-4,-47-55		0-2.0 u/1.4 grave	Lt. town the coarses	w/ trac	Sand e find MSC of		refere	nee		0.2	

FIELD	BORING	LOG					BO	RING I	10 .	P\$8-8	404	
COJECT NO	.: 5753- 08	PROJECT	NAME:	USATHAMA	- BAA	P	<u></u>			PAGE 3	0f 5	
ILLING C	ONTRACTOR: LAY	NE-NORTHWEST		DRILLER:	K	ONEY PARE O	ATE STA	RTED Z-	·Z-	89 co	IPLETED Z	6-89
THOO: H	SA	CASING SIZE:	25	"J. C	> .	11P ev: 井1つ		PROTECTI	ON LE	VEL: C-	DERM	4
COMO ELE	v.: 822.6	SOIL DRILLED:				LEVEL:	<u>-</u>	TOTAL DE	PTH:	100'		
GGED BY:		HEL B. CHEC		911	राष	7 SATE:						
											P.	I Hea
AMPLE NO.	DEPTH IN FEET	BLOUS PER 6-INCHES	PEN.			DESCRIPTION				COMMENTS ON ANCE OF BORI		TORING
5-13	24'-26'	25-96-93-10 4	1.9	Coars	1 54.	5 5-12 Id w/ trace f-91 rel Lens es e acs-12, increase	wel,	w	A	IALYTICA	Blog	0.4
\	×	\ .				COATSE 5	and		*	100000	Aka	
:-14	26'-38'	10 - 45 - 2-4 0	1.6	San	ne 15e	5-12 sand Lens	0	26.4'	Reg	fuence		0.2
-15	28-30'	21-70 - 100	1.4	0-0.1 0.9-1 f-mcc w/tro coarse	9 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6	Some as S snow pt framely and willittle co fine gravel, w rivel, well grad damp (G	Sundarse fra	d gaul ce	Ken	glenct	18 45	6.2
; -16	30'-32'			Sau	e le le le le le le le le le le le le le	as 5-12 se soud len	,		A	WALYT	. Dhy	0.2
-17	40-42'	22-44- 1 0-82	2.0	11 4	fine , pa	-m sand w/ll gravel trac orly graded (Sp)	duce		4	nalyho	at lig	0.5
- 18	56-52	15-4-41-65	2.0	0-1.0 1.0-2.	5	Anne as Lit tan f- e fine grand foorly graded	m 5a c/, d	zup	A	raly h	cd Skg	4

	BORING				BORING N	10. FBB -	8104	+
NOJECT NO).: 5753- Ot	PROJECT	NAME:	USATHAMA- BAAP		PAGE 4 C	5	
RILLING C	CONTRACTOR: LAY			DRILLER: FORLY PARE DI	ATE STARTED Z-	2-89 COMPLE	TED 2 -	6-89
ETHOD:	KA	CASING SIZE:	4.25	"I.I. TIP ev: #15	PROTECTIO	N LEVEL:	ERM	١.
ROUND ELE	× 5726	SOIL DRILLED:	10	yater Level:	TOTAL DEP			
OGGED BY:	1. 14	HALL B CHEC	KED BY	: 950 2/27 8 DATE:				
							72	- He
SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6-INCHES	PEN. REC.	DESCRIPTION		COMMENTS ON ADVANCE OF BORING	MONIT	ORING
		10-19-20-23		04 sand 15 stained	ļ	Excounter waste,	1 Eggs.	2.9
-20	70-72	9-18-75 160	2.0	W1 Statification du	· 1	waste	29pp-	n 28.0
				1-0-2.0 Brown f-m	avelly Sand	change to gravelly Sund		
				With his seet, will coarse-gravel, well	graded	@71'		
·;			•	damp, videnst, grav stained w/ green	el - /	Anniphes!	•	
5-2!	74-56	19-40-40-35	1.9	v/m-f sand, w/ ki cooise grave (1-2")	46	inaugo to -	3	.5
				damp (GW)	se,	Grave (
				Jeen Stained and Through out gold		halpha!		

FIELD	BORING	LOG			BOF	RING NO	D. FB	B-89	
PROJECT NO	1.: 5753- 09	PROJECT	NAME: USAT	IAMA- BAAP			PAGE E	or S	
ORILLING C	ENTRACTOR: LAY	NE-HCRTHLIEST	SRIL	.57: Paper	PAPR DATE STATE	2 2 -	689	COMPLETED 2	-6-89
METHCO:	157 I	CASING SIZE:			±=10	PROTECTION	LEVEL:	Depus	
		SCIL DRILLED:	99.8'	WATER LEVEL:		TOTAL DEPT	H: /00	,	
LOGGED BY:	P.C.K	14 CHEC	KED BY:	227 81	DATE:			Heat Sp	alla
SAMPLE NO.	DEPTH IN FEET	SLOWS PER 6-INCHES	PEN.	DESC	KOITGIST		COMMENTS ADVANCE OF I	BCS:NG	LE LE
		343-42-68	1.9 24	smalling of smalling of smalling of little rearest damp, der	mod was a object of the fine gravel well well well well well well well w	iand is	Acoustands and 11	eliq from revel 8	1.0
5-23	90'- 92'	१५-५:-55	1.0- W	Little dark hace fine: approvense 20 U. lan trau coara	brown coarse sh gravel, poor-g [GP] f-m shud sand, v. un. d, damp, ters	rudect C	hange to the sau	nd SE	
5-24	156:102°	5-10-6-15	Cos qual	little for - 50 areselvel, viell-	gravelly fand ind white for the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following the following th	ne 1	home to pavely	tisk 1pp	.2

No visible waster BIR AGC

ELD	BORING	LOG	<u> </u>				BOF	RING N	O. PB6	3890	5	······································
).: 5753- 08		NAME:	USATHAMA-	BAAP				PAGE	1 0	F (
DRILLING C	ONTRACTOR: LAY	NE-HORTHUEST		DRILLER:	ma	ARE	DATE STAR	RTED 2.7	- 89	COMPLE	TED Z-	13-89
METHOD: H	51	CASING SIZE: _	1.25	"ID	TIP				N LEVEL:	- DE	PMAL	-
		SOIL DRILLED:			ATER LEVEL	.:		TOTAL DEP	TH:			
		CHEC		:		DATE:		\		T-4	•	
<u> </u>	11111111								Ke	ad Spa	ee B	kg = 0
SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6-INCHES	PEN.		DE	SCRIPTION			COMMENT ADVANCE OF			TORUG
			REC.								TIP	-46-
5-1	oʻ-⊋'	96-115-56- 341	13	Dr. Bi plast hand	- sill - c , 1 .	ty clay strff, c Fill	- Froz		154 54 6 RUJ. 5-		O	0
5-2	2-4'	16-24-16-14	7.0	plant fine		F:11	, moi diff, th L-OL	oti o	ref.		0	0
5-3	4-6'	22.45-43-5	2.0 1:9	4.0-4. 4.5-5	5- S .0 Da Lt, fr	int m	um sand	ndy	and.		1	.1
				50. 4.1 50.4.1 9764	ose, d o It. nel, li rel, n k brom	brow Hief ied. Je	ngnau inetru mse w typam	elly	edible	o 5		
5.4	6-8'	40-74-78-100 pr. 5"	30/3	coan coan coan	e finic ne en nse a aded	avel. and, Nat	med pool	to 1	Ref.	4	0	.2

		·		PORING	NO 222		
FIELD BORING				BUNING	NO. PBB-890		
PROJECT NO.: 5753- 08		NAME:	USATHAMA- BAAP		PAGE 0		1/2/50
DRILLING CONTRACTOR: LAY				TE STARTED 2			13/89
METHOD: HISP	CASING SIZE:	4.2			ON LEVEL: Der	mi	
GROUND ELEV .: 879.9	SOIL DRILLED:		WATER LEVEL:	TOTAL DE	PTM:		
LOGGED BY: E. Moore	P Kay CHEC	KED BY	: DATE:			<u> </u>	- P/.
	·	<u>. </u>	1		Head	_	
NO. DEPTH IN FEET	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	į	COMMENTS ON ADVANCE OF BORING	TIP	TOR NG
5-5 8-101	180 500 .49	0.4 1.4	same a above	_	on Lowden wil have	0	3.8
5-6 10'-12'	19-130-40 For 2"	1.2	Shift in location ~ How in - boulder hisher Brown gravelly as	pregnent	No and.	0	.3
5-7 /2-14	83-95-98- 86	4.0	Br. Grandly Sa well graded, Since gravel, trace coa damp, very dense Some black coanse	me egs .	Anal and Ref.	0	7
5-8 14-16	si-95-111 pn.4"	13/10	Same as altre	• •	RY.	0	.2
5-9 14-18	31-41-41-45	2.0	16-16.8 Same as as 16.8-18 Lt beaun a trace gravel po gradel (united dense	roly	mal @ Orange & Fill - Notive Sampled Maturi and	C	0
s-10 18-20'	15-29-38-43	a.o.	traces fine grave graded, darker so (clear stratification Whate customed at 19.8 Green Triations, and	r-olive	Anal· and	0	0

(similar to wasters PBB9904)

<u> </u>	BORING		NAME .	BORING	NO. PBB9965	F 6	
	CHTRACTOR: LAY			ORILLER: R.P. DATE STARTED A	!	-	/13/89
			<u> </u>		ICH LEVEL: Dann		
METHOD: A		CASING SIZE: 4		WATER LEVEL: TOTAL O		مزحم	ray D
				<u></u>			
	C. Merre	P. Kay CHECK			Head Se		kaza
SAMPLE NO.	NI KTGBO	BLCHS PER 6-!NCHES	PEN. REC.	· DESCRIPTION	COMMENTS ON ADVANCE OF BORING		TOR: 15
5-11	२०-२२'	15-29-43-67		20-21.6 Same as above 20.5-20.6 Observed waste saturation - greenish, monet layer (PI.1).	Anal. † Ref. Change at 21.6	/	51
			_	21.6-22 Brown gravely sand, very dence sme. fine to med gravel, dryer than west lense.	Sand -> Grand	4	
5-12	22-21	49-54-73- 99	<u>એ</u> એ	22-22.8 Brown gravelly sand (as expect) 2.8-23.4 Ten sand-	Change at 22.8		
				prorty graded (uniform) 23.4-24, Brown gravelly aund, very dence, some fine gravel (less gravel than above and mostly fine as opposed to med.)	anal &		
13 5-4	a4 - a6	31-45-40-60	1.7	Same an above, nich, a lense of fine tan sand at 25-25.3'. Brevelly sand has some course hand. Tan wy black flichs. Grevel varies in color from grey to mutual to real	and	1.5	
				Waste observed at 24.6- 24.8' sampled.			

FIELD BORING	LOG		BORING NO). 7B <i>B</i> 8	905				
PROJECT NO.: 5753-08	PROJECT NAME:	USATHAM	- BA	P.			PAGE 4	OF	6
DRILLING CONTRACTOR: LAY	NE-NORTHWEST	ORILLER:	: R	Para	DA	ATE STARTED 2/7			
HETHOO: HSA	CASING SIZE: 4.25	・エバ	>	TIP eV:	٥	PROTECTION	LEVEL:	avel [>
GROUND ELEV .: 879.9	SOIL DRILLED:		WATER	LEVEL:		TOTAL DEPTH	3		
LOGGED BY: Chine /P.	Kay CHECKED BY	':		DATE:				Jac	

		·			Head S	dce	Bleg :
SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6-INCHES	PEN. REC.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	TIP	TORING
s-14	26'- 28'	76-107-50- 56	ने (जी ५	Same as above to 27.8' Dark brown sand lense at 27.2-27.4 27.8-28 Light brown medium sand - prophy goded	et 27.8 ag. sand-	δ	
S-15		31-72·83- 96	2.0	Light brown sound.	eif.	ò	
5-16	30-32	\$5-40-42-	न्निः	Light brown greetly sand, dense, Traces of fine to med greet Lans of darker panel at 30.5-30.8.	anai E Ry (2/8)89)	0	

ELD BORING	LOG			BOR	ING NO.	PBB-89-05
PROJECT NO.: 5753- 08	PROJECT NAME:	USATHAMA- BAAI	ρ	<u> </u>	PAGE	5 of 6
DRILLING CONTRACTOR: LAYN	E-NORTHWEST	DRILLER: R	PURR	DATE START	ED 2-7-89	COMPLETED 2-13-89
METHOD: HSA	CASING SIZE: 4.75	" T.D.	TIP ev: #	10 P	ROTECTION LEVEL:	Level D
GROUND ELEV .: 879.9	SOIL DRILLED:	WATER	LEVEL:	Т	OTAL DEPTH:	
LOGGED BY: T. KAY	. CHECKED BY	•	DATE:		· · · · · · · · · · · · · · · · · · ·	

SAMPLE NO.	DEPTH IN	BLOWS PER	PEN.	DECCRIPTION	COMMENTS ON	MONI	Heal S TORING
		6-INCHES	REC.	•	ADVANCE OF BORING	TIP	LEE
		36-40-53-68		L-sand lens @ 0.8' (40.8')	Analy 5 Ref (2/13/89)	0	
5 18	20'-52			tan f-m sand. w/trace f-m gravel u/trace course gravel w/tr c sand mod. dense, damp, (SP) stratified of veware: 50.8'	Analytical is Reference waste @ 50.6	.9	
519			2:0	c-sand lens (0 = 60.5' Nuste (olive-green) stratified C 61.7'- very sweet smell	Analydical Polorince	g.8	
		25 -32 - 37 - 58	5/2	Jame as 6/8, dark (Sp) I waste strut. Lications I throughout spoon WASTE WASTE	Analytical Reference	28	
21	91'-82	100 foi. 4"	40	No Recovery A few m-coarse gravel pices w/ trace c-sand No Analy freal	Reference	0	

FIELD	D BORING	LOG	 -			ВО	RING	NO. F	BB-89-	05	
	0.: 5753-		NAME:	LAE - AMANTAZU	P	!		PAGE		F	
CRILLING :	CONTRACTOR: LAY	NE-NCRTHWEST		DRILLER: R.	DATE	DATE STA	RTED 7	- 9 -89	COMPLE	TED Z/	13/10
HETHCO:		CASING SIZE:	4.2		TIP ev:			ICH LEVEL:	D		70
GROUND EL					LEVEL:		TOTAL DE	PTH:			
LOGGED BY			YE CZX	:	DATE:						
SAMPLE NO.	DEPTH IN FEET	SLCUS PER SBEDN!-6	PEN.	<u>!</u> !	DESCRIPTION	-M			HTS CH OF BCRING	MCMI	TORING
522			1.0	c-sund	roun bandy c-gravel dense, d	,- title amp, \$	He ,	Reference of more	ucl	.8	
	106-102'			C-5and w/ trace (160-100.7 P-grad	wh Sand w/trace C-Grave damp) flots	fm quel, dens	ravel sc	Daly Refe change	•	0	
524	109-112'	14 -23 - 41-75	20	No RE	110			No Ref	erence	0	

ELD BORING LO	OG	BORING NO. PG	B-8706	
PROJECT NO.: 5753- 08	PROJECT NAME: USATHAN	A- BAAP	PAGE	of 4/
DRILLING CONTRACTOR: LAYNE-N	NORTHWEST DRILLER	R. PARR	ATE STARTED 2-14-89	COMPLETED
METHOD: ISA CAS	SING SIZE: 4.25 T.	TIP ev: #	PROTECTION LEVEL:	D
GROUND ELEV .: 881.9' SC	OIL DRILLED: 1/Z	WATER LEVEL: //0	TOTAL DEPTH: 1/2	
LOGGED BY: PKAG	. CHECKED BY:	DATE:		

SAMPLE	DEPTH IN	BLOUS PER	PEN.	DECCRIPTION.	COMMENTS ON ADVANCE OF BORING	MONITORING		
NO.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BOXING	TIP	LEL	
51	0-2'	40-70-70-37	1.6	DK. Brown 511/g Dayen w/trace f-m sand, w/tr c-sand, stiff, non-plastic damp, AH Frozence (Fill)	Roference All Frozen	O	C	
32	2'-4'	15-15-12-10	7.0	03 SAME AS ABOVE FROZER .3-1.0 DK. Brown Tilty Clay witness f-M sand, stiff, mad. plst damp (CL) Add	Ref Dog-1.0 Frozen Fill	G	0	
3	4'-6'	5-6-5-6	1.5	Dk Bran 5. Hy Clay wft Single from sand, wftrace m-c grand 51. plastic, so soft, damp - Fill- (CL)	Analytical Ref. fill	0	2	
5-4	6'-8	5.5.5.5	1.8	DK Brown Jandy Clay f.m sand, sl. plastie, soft dump ydi. Work of the (CL) sifty) Brown wood showing -FIII.	Reference	0	2	
5-5	8'-10'	1-2-3-5	7.0	07 Same QS 5-3 .7-1.9 Br. Silty Clay, w/trace m-sand, viplastic V-damp, V-Soft, W-Some burn wood piece throughout speen (a	Reference + - Fill -	็จ	Ó	
5-6	10'-12'		1.4	To Brown clayey si n/apprent wood fibers a some nosa, firm to stiff, moist, mod plastic #mod. to strong odor	Analytical taken		0	
7	12-14	2-17-14- <u>5</u> 5	2.0	Brown Good wi/ Dr Bloom . Black Staining, damy, bosse Strong Odor	Analytical Refer	1166		

FIELD BORING	LOG	BORING NO. PBB-8906				
PROJECT NO.: 5753- 09	PROJECT NAME	USATHAMA- BAAP			PAGE Z	0F 4
DRILLING CONTRACTOR: LA	YNE-NORTHWEST	DRILLER: Papale	4 TOPE	DATE STARTED Z-19	-59	COMPLETED
HETHOO: #SA	CASING SIZE: 4.2	T.D. 11P	d: #/	PROTECTION	LEVEL:	ENE D/LEUEL
GROUND ELEV .: 981.9	SOIL DRILLED: //	2' WATER LEV	L: //0'	TOTAL DEPTH	: 11Z'	
LOGGED BY: YAK	. CHECKED I	DY:	DATE:			_
7						

SAMPLE	DEPTH IN	4		PC-00187104	COMMENTS ON ADVANCE OF BORING	MONITORING	
NO.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
j-8	14-16	100 - 100 for . 1	15	Some an Above	ANAL.	800	
				Strong Odor (Waste)	Ref.		
5-9	16-18'	100-100 fg.2	37	Gravelly Sand (4. Brown) H/C-gravel, tr-m-gravel V. dense, damp, pr. guled Stained w/ other Waste very strong odor SP) Native	Change for and aparelly of the change to the change to the change to the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the change of the	450	
5-10	18'-20'	13-17-17-17	2.0	SAME AS 5-9.	Refer.	1020	
	DIGHT PL			Stained w/ Olive Was to Strong Odor Native:			
5-11	20'-22'	8-15-14-10	2.0	Spoon stained w/waste (Sp)	Analytical Ref	550	
5-12	25'-27'	2-4-5-6	2.0	Waste) Whate c-5 and, loose v.damp Naha	Ref.	900	
5-13	30'-32°	1-1-1-2	7.0		AsR	300	
5-14	40'-42'	7-9-9-7	2.5 2.0	Brown Gravely Sand m-found w/frace Coarse Gravel w/tr f-grave m/tr-c-sand, wamp, well-graded	A;R	45	
.,	•			(SP)		•	J

LD BORING LOG	BORING NO. 033 - 8906
PROJECT NO.: 5753-08 PROJECT NAME: USATHAMA- BAAP	2 PAGE 3 OF 4
DRILLING CONTRACTOR: LAYNE-NORTHLEST DRILLER: MODNEY	FARE DATE STARTED 2-14-89 COMPLETED
HETHOD: HIA CASING SIZE: 4.25" ID. TIP W:	# / PROTECTION LEVEL: Level C
GROUND ELEV .: SOIL ORILLED: 1/2 WATER LEVEL:	110' TOTAL DEPTH: //Z'
	DATE:

SAMPLE	DEPTH IN	BLOWS PER	PEN.	Decement	COMMENTS ON ADVANCE OF BORING	MONI	TCRING
NO.	FEET	6- Inches	REC.	DESCRIPTION	AUTANCE OF BURING	TIP	LEL
5-15	20'-52'	15-23-28-58	20	SAME AS 5-14 But Spool is <u>NOT</u> SAT WIMASTE WASTE IS STRATIFIED THABULHOUT Spool - GREEN IN COLUR.	Knowas	9 ·	
15-16	60'-62'	17-24-40-77	2.0	tan Sand fine w/trace C-sand, w/trf-m	ANALYTICAL ROFERENCE	9	
				gravel, mod dense, damp prograded Coarse send lense @ 61.5' A few strafifications of When through out the	Sand to d form grandy		
5-17	70'-72'	. 19-29-48-76.	2.0	SAME AS 5-16 SILY SAND LENSE @	Anal.	51	
5-18	80'-82'	80-111-90 -100 for.3'	<u>1.8</u> -8	Weste Atraffied throughs Aproon LI. Brown Dandy GANVE (M-C) The Company of the Company Many sand where & sand,	Analytical Referen	0	
				W/ little m.grapol, w/tracs coard graves, damp, v-done, w-grd. No wash present (GW)	Nowaste		

FIELD	BORING	LOG				BOF	RING N	0. PB1	B-'	8-	1
PROJECT IX).: 5753-	PROJECT	NAME: U	ISATHAMA- BAAP		<u> </u>		PAGE 4		4	
DRILLING (CONTRACTOR: LAY	NE-NORTHWEST	٥	RILLER: K. TARR	D/	ATE STAR	TED 2-1	4-89 0	MPLETE	D	
HETHOD:	BA	CASING SIZE:	1.25	" I.D. TIP ev:	#1		PROTECTION	LEVEL:	>		
GROUND ELE	v.: 88).9°	SOIL DRILLED:	112	WATER LEVEL:	110'		TOTAL DEPT	H: //Z'			
LOGGED IT:	Pika	CHEC	KED BY:		DATE:						
SAMPLE NO.							ING -		TORING		
			REC.						<u>.</u>	TIP	LEL
			1	Brown Gravelly c-sand w/som w/trace c-grave pr-grd. No 1	cl, den	ле, V. 1 5Р	damp	Analyt. Befor		0	
ý-20	/60°-102°	21-45-67 -83 /j	2.0 2.0 V.4	Tan sand, damp, dense	f-m,	Property of	grd h	Analy		8	
3-21	110'-112'	25- 3- 2-25	2.0 1.02	Brown C-Sau w/same f-gra m-Sand, a Saturate		w/tru pr. z	que ,	Anal.			
				Bois	3 110	2					

ELD BORING	LOG			BORING NO. PBB - 8107			
MEJECT NO.: 5753-08	PROJECT NAME:	USATHAMA- BA	AP	PAGE 1 OF 3			
DRILLING CONTRACTOR: LA	YNE-NORTHWEST	ORILLER: R.	PARK	DATE STARTED Z/14/89 COMPLETED 2/7/89			
HETHOD: HSA	CASING SIZE: 4.2	5"	TIP ev:	10.0 PROTECTION LEVEL: C DERMAL			
GROUND ELEV .: \$78.6	SOIL DRILLED:	WATES	LEVEL:	TOTAL DEPTH: BO FECT			
LOGGED BY: JS, BUT	. CHECKED 8	Y:	DAT	E:			

SAMPLE	DEPTH IN	BLOWS PER	PEN.		COMMENTS ON	MONITORING		
NO.	FEET	6-INCHES	REC.		ADVANCE OF BORING	TIP	LEL	
5-1	0-2	250for.5	39/5	Br sim-fse w/some m-se, frozen Fill	Ref.	0		
5-2	Z-4'	9/11/122	20	Br si clay, w some to little msa, stiff, dry, mod. plastit Fill	Action REF	0		
5-3	4-6'	24/50/95/92	2:0	Be GR SA, F-MC SA W	COBBLES			
			1.8	DRY WARD FALL	Analytical	0		
	/	10/10/2/10	1.5	Br mandy gul, dry, med	Ref.			
7-4	6-8	for.5	19	Br mandy gul, dry, med dense, p.graded, nonpl.	Drgray change	20		
5-5	8-10'	63/00/100 for.5	1.5	5/milar 18 5-4	Rof.	0		
			L.	similar to 5-4, gv1 % < at the bottom of the sample 11.5	Analitical Taken BNA, NAM	0		
5-7	12'-14'	50/58/48/56	1.8	similar to 5-4 w/a change to m-f sa w/trace gvl (apparent native?)	Change @ 13.0' to Native Soil	0		
5-8	M'-16'	2438/36/3E	2.9	LtBr 3i m-f sa w/ some med. rounded gv/, 31. moist, bose, poorly sor graded, nonpl.	Analitical Taken	0		
5-9	16'-18'	17/26/33/41	20/20	similar to 5-8. w/ 2 96 of qv1, slight stratification	Ref. Taken	0		
O	18-20'	16/32/41/55	20	TAN F-4 SA U/TRCSA GRADING TO A MUSTLY VF-F SA U/ TR SILTY SALD LAYELING, P GOD LOUSE, DAMP SP	REF	٥		

FIELD BORING	LOG	BORING NO. P68-8707					
PROJECT NO.: 5753- 58	PROJECT NAME:	USATHAMA- BAA	P		PAGE	2 of 3	
DRILLING CONTRACTOR: LAY	NE-NORTHWEST	DRILLER:	PARR	DATE STARTED Z//	6/89	COMPLETED	
HETHOO: HSA	CASING SIZE: 4.2	51	TIP eV: 10.0	PROTECTION	LEVEL:	C DELHAL	
GROUND ELEV .: 878.6	SOIL DRILLED:	WATER	LEVEL:	TOTAL DEPT	H: 80	FEET	
LOGGED BY: 15 BI	CHECKED B	Y:	DATE:				

SAMPLE	DEPTH IN	BLOWS PER	PEN.	OCCUPATION AND ADDRESS OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE	COMMENTS ON ADVANCE OF BORING	MONITORING		
NO.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BOXING	TIP	LEL	
5-11	t .	1	1 -	Similar to 5-10, w/ weathered rock frag.	Analitical Taken (3NA)	D		
5-12	22'-24'	45/54/60	2:0 1:7	similar to 5-10 w/7	Ref.	Ø		
5-13	24-26'	२० ऽ८ वध्यम	20	similar to 5-10	Analitical Taken	V		
3-14	Z6'-28'	25/45/56/76	20	Similar to 5-10	Ref.	0		
5-15	28'-30'	15/33/50/100	20	similar to 5-10	Ref.	0		
5-16	30'-32'	33/65/100 for 0.45	12/2/2	LTBr m se w/ some trace si, little rounded m gvl, sl. moist, loose, poorly graded, nonplastic sw st	analitical Taken	0		
5-17	40'-42'	12/58/6/66	200	1+8- 40'-41' similar to 5-16 41'-42 Lt Br m-fsa w/little frounded gv1, sl. moist, loose poorly graded, nonplastic sw-sp	4/	0		
5-18	50'-52'	76/50/61/73	20/24	50-51.7 LT BR PERD F-M SA, LOOSE, DAMP 51.7-52 LT BR UNIFORM F SAMD SP	AMPLYTICAL	O		

٠.

IELD BORING	LOG	BORING N	BORING NO. PBB-8907			
PROJECT NO.: 5753-08	PROJECT NAME:	USATHAMA- BAA	LP		PAGE 3 OF	3
DRILLING CONTRACTOR: LAY	NE-HORTHWEST	DRILLER: 2	PARL	DATE STARTED 3/16/	89 COMPLET	ED 2/17/84
METHOD: HSA	CASING SIZE: 4.2	5"	TIP ev: [D.O	PROTECTION	LEVEL: C DER	
GROUND ELEV.: 878.6"	SOIL DRILLED:	WATER	LEVEL:	TOTAL DEPT		
LOGGED BY: JS, BCH	CHECKED B	Y:	DATE:			

SAMPLE NO.	DEPTH IN	BLOWS PER	PEN.	aceco intigu	COMMENTS ON	MCN 1	MONITORING		
	PEEI	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL		
5-19	60-62'	30/10/78/ 100 for 4 hoches		HI BE SAND, PERD, ALTGUNING LAYERS (~ 0.4-06') OF F-H W/ TEC SAND AND F SA LOOSE, DAMP SP	- AUALYTICAL •	0			
5-20	70-72	42/60/65/. 100 tru 4 Noches		SPOON, 15' ANGEL, AND 10'OF A ROD LOST DOWN HOLE. S-20 COULD HUT BE RETERINED.	Cobbie Zone-Street				
				Bob = 80 FEET					

MAP Coving Fire Complete

FIELD BORING	LOG	BORI					
PROJECT NO.: 5753-08	PROJECT HAHE:	USATHAHA- BAAI	9		PAGE	(OF	3
ORILLING CONTRACTOR: LAY	NE-HCRTHUEST	DRILLER: Jet	Y Seager	DATE STARTE	D 1-6-89	COMPLETE	1-19-89
	CASING SIZE: 0.4	00 \$ 10'	TIP W:# /0	Pf	ROTECTION LEVEL:	D	
GROUND ELEV.: .878.1	SCIL DRILLED: Z6	O.S' WATER	LEVEL: ± 120	TO	OTAL DEPTH: 26	0.5'	
LOGGED BY: FREDERICK	Brasdon CHECKED &	Y:	QATE:	-6-89 —	-		

Sample No.	DEPTH IN	BLCUS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONITORING		
	, , , ,	O- INCIRES	REC.	963604F136M	AND OF BUXING	TIP	LEL	
	0-4'			Dark brown SILT (Loress)		Beckgre	-0	
5-/	49-11		1.2'	Brown Medita to Gravel with Meterry of Lt & and dk brown SILT and Sonal, (S-1)	See field note Book			
5-2	20 - 22		1.5	Blown Sandy Gravel over 1844 n gabbro cobble (.v') 60er well strattfrag	Pages 1 to Note Book \$5 (Dep Borings/moner	DE N		
s-3	30-32	35/12"	1.1	brown faintly Stratified and to 6. Sound w/ tr y five grave! (5-3)	wells			
6-4	47 -		+	want s'un kala .				
5-5	47-49	30/12"	1.1	Brown fine soud (5-5) w/ 3thin				
5-6	57-59	38/12"	1.2	Br med to Gr. Soud w/ fine Grave 1 (3-6) grading to beach soud (for to ned Sono)				
3-7	67-69	48/12°	1.2	Brown faintly stratified uniform fine to mad SA (57) w/ one thin SA fine graval (SP)				
5-8	77-78.5	7100/12	.9		10 (km)			

51 D DODUNG		POPING NO							
TIELD BORING	LOG	BORING NO. PEB-59-10							
PROJECT NO.: 5753- 08	PROJECT NAME: USATHAMA- BAAP	PAGE Z OF 3							
DRILLING CONTRACTOR: LAY	NE-NORTHUEST DRILLER: Jeff Sager D.	ATE STARTED (-6-97 COMPLETED 1-19-86							
METHOD: Mud	CASING SIZE: 0.9' TIP ev: #10	PROTECTION LEVEL:							
GROUND ELEV .: 878.1	SCIL DRILLED: 260.5' WATER LEVEL: ± 170'	TOTAL DEPTH: 200.5							
LOGGED BY: Fled Brz	a class CHECKED BY: DATE:								

Sample NG.	DEPTH IN FEST	BLCUS PER 6-INChās	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MCNI	1708 : NO
			REC.		O. BOR.NG	TIP	1 151
5-9	87-87.5		.4			i	
5-10	97 - 99	75/12"	1.2	Br-SANDY Grave 1 to Grave 1 (high porowity?) (GW)			
5-11	106-108	50/12"	1.3	Brown SA Gravel w/			
)	121-127	100/12"	,8	Brown fine to med SAND in Loyers (52)	Vennege @ 120	,	
5-13	131-133	42/12"	1.4	Brown med SAMO w Some Co. SAMD and few publication	2)		
5-14	141 - 142	>100/12	1.3		160 € 140		
5-15	149-151	78/12"	1.1	Co SANDY Gravel			+
5-16	159-161	100/2"+ 30/2"	1.4	G SANDY GREET (GW)			+
S-17	169-171	45/12"	0.8	co SANDY Gravel of lauger coboles (qu)	· charge =	217	1
3-18	179-18(24/12"	1.4	Reddren brown & to had sand messare no strata uniform (
7	189-191	7100/12"	.7	SAME uniform (SP)		<u> </u>	-
3=20	199 - 201	49/12"	1.4	same Relbaum fit had SA uniform (SA	2		+-
5-21	209 - 210.5	>100/12"	1.2		•		

FIELD BORING LOG	BORING NO. 735-89-10
PROJECT NO.: 5753- OB PROJECT NAME: USATHAMA- BAAP	PAGE 3 OF 3
DRILLING CONTRACTOR: LAYNE-NORTHWEST DRILLER: Jeff Seege DA	ATE STARTED 1-6-89 COMPLETED 1/19/8"
METHOD: MUD COME CASING SIZE: 0.91 TIP W: #10	
GROUND ELEV.: 4 878. 1' SOIL DRILLED: WATER LEVEL:	TOTAL DEPTH:
LOGGED BY: J. P.CHECKED BY: DATE:	

SAMPLE NO.	DEPTH IN FEET	BLCUS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON	MONI	TCR: YG
····	7651	9-14CHE3	REG.	OESCRIPTION	ADVANCE OF BCRING	TIP	LEL
5-22	Z19-205		1.5	Radis + Brown fine to med sand ul Trace of gravel Dense, wet, non plassic (sp)			
5-23 and	227-231 of \st	10 DM	5 5 S	Similar to S-ZZ but wincreme in SiH. (5P)	few copyled decilling from 229 to 239		
5-24	2 39 -741	175 for Toron	z.0 1·5	Reddish Brown to Gray Uniform fine to medium Sand w/ Trace of Silt thin Silt Cayor, non plasse wet, Dense (SP)	few cobbles dr. 11 ing fice m 239 to 249		
5-25	249-25i	140 for Z.s' Evendliving	N 0.	Similar to S-24 but w/ few Stratified medium Sand layers	few cassics brown 247 to 257		
5-26	257-262.5°	300 fee 1.0' 150 Are 0.5' Very MADO Deinny	.5/s	Pop 1.0' 13 Relians Beam to gizay sond uf gravel of Quarters cosse @ 260' Change to White of Light Brown fine to med sand/ gand store. Very dense now plasme and comments	Brown of Baling & 260.5' In whole/ Blown wears I stand stone.		

ENGINEERING INC

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

Boring No. PBB-82-01
Surface Elevation ... 876.8
Job No. ... C. 10313
Sheet ... 1 ... of ... 2

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SAMPLE		PL	E		VISUAL CLASSIFICATION	SOIL PROPERTIES					
	Reco	very	ry Meisture and Remarks					100	l		
Ne.	Type	↓	+	N	Depth		q.	W	ш	PL	D
1	SS	15"	M	28]; 	3" GRAVEL & CINDERS, 12" TOPSOIL Very Stiff, Dark Brown (10YR 3/3) Silty CLAY (CL)					
2	3"ST	18"	М	_	K,	** Occasional Sand & Gravel at 4'	(2.5)				
3	SS	12"	М	51		Very Dense, Light Olive Brown (2.5Y 5/4) Fine to Coarse SAND, Some Silt & Clay, Some Gravel,					
4	SS	8"	М	61	E 10_	Occasional Cobbles (SM)					
5	SS	12"			11.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1						
6	ss	7"	M	20	E 20 -						
7	SS	12"	M	26	25-	Medium Dense to Very Dense, Light Yellowish Brown (2.5Y 6/4) Fine to Medium SAND, Little Silt, Some Gravel (SP-SM)					
_8	SS	15"	М.	65	30-			ocket	Pene	trom	ater
					35-	* 2.5' of Frost Present **Shelby Tube Hydraulically Pushed at 1100 PSI from 3' - 5'		Readin	g, TS	F	



LOG OF TEST BORING

Project	Badger A	Army Ammu	unition	Plant
Location .	Bara			

Borina N	o. PBB-	82-01
	Elevation	
	C. 103	
Sheet	2 of	2

1409 EMIL STREET + P.O. BOX 9536, MADISON, WIS. 53715 + TEL. (606) 257-4646,

	SAMPLE			\(\(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\) \(\alpha\	so	IL PI	ROP	ERT	IES		
	Recovery Meisture			VISUAL CLASSIFICATION		I	T	1			
No.	Type	+	1		Depth	and Remarks	•	W	u	PL	D
					ليليليا	Medium Dense to Very Dense, Light Yellowish Brown (2.5Y 6/4) Fine to Medium SAND, Little Silt, Some Gravel (SP-SM)					
9	SS	15"	М	38	50-	Less Silt at 49'					
					יויין	End Boring at 50'					
					- -55-						
					E _m						
					امليا						
					-	•					
					-65- - - -						
					F.						
					70- 1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1						
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			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	ΔΤ	-85- FR	LEVEL OBSERVATIONS	GE	NER	AL	TON	ES
	ile Dr	_			Orilling	None	GENERAL NOTES Start/18/82 Complet 2/18/82 Crew Chief 55-1				
	ne Af				k hou		Orilli	ng Met	nod C	S 0-	l <u>o'</u>
	pth to pth to			-	10.01			VO 10- 1") 0-			

LOG OF TEST BORING

Project .	Badger Army Ammunition Plant
	Baraboo, Wisconsin

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	S	AM	PL,	E		\(\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tint{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tint{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tinit}\\ \text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tin}\	so	SOIL PROPERTIES								
	Rece	very	Mois	ture		VISUAL CLASSIFICATION and Remarks		T								
No.	Type	+	ţ	N	Depth	and Remarks	4		W	u	PL	0				
					E	12" TOPSOIL										
1_	SS	14"	M	11	E	Stiff, Brown to Dark Brown (10YR 4/3) Silty CLAY, Trace	(1.5	<u>) </u>		<u> </u>						
	B"ST	6"	M		$\mathbb{K}[\]$	of Fine Sand (CL)	-(1.4	ı v								
	3 31	0	_M_	Ė	E											
3_	ss	18"	М	16	F	Loose to Very Dense, Light		-								
	-	7.0"	•	10	Εl	Olive Brown (2.5Y 5/4) Fine to Medium SAND, Little Silt,	-	+								
4	22	18"	M	10	E 10-	Some Gravel (SP-SM)	-	+				<u> </u>				
				-	ŧ l	Color Change to Light Yellowish	-	+			-					
5_	SS	8"	<u>M</u> _	35	15-	Brown (2.5Y 6/4) at 14'	-	+			_					
					F											
	 			 	Εl		-	+								
6	<u>\$\$</u>	18"	M	42	20-		-									
					E		1									
					-		-									
7	<u>ss</u>	12"	M	72	_ ₂₅ _			+								
					E	Trace to Little Gravel from										
					<u> </u>	14' to 29'	<u> </u>	-								
8	SS_	12"	М	24	<u> </u>		Ţ	1	_							
					E			Poc Rea	ket din	Pene g, TS	trom F	eter				
					<u> </u>					, .						
				ļ	-35-	Medium Dense, Light Yellowish	<u> </u>	┦—								
					F_	Brown (2.5Y 6/4) Fine to Coarse										
					F	SAND and GRAVEL, Little Silt (SP-SM)										
					E 40-	* Challer Tibe Dischad Unduring and The	_									
					F	* Shelby Tube Pushed Hydraulically at 600 PSI from 3'-5'										
					E											
					E			_								
							-									
					•	(Continued)	1									

LOG OF TEST BORING

FOR OF 1521 BOKING	Boring No. PBB-82-02
Project Badger Army Ammunition Plant	Surface Elevation8839 Job No C. 10313
Location Baraboo, Wisconsin	Sheet2 of2

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	S	AM	PL	E	•	VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	IES
	Rece	very	Meis	ture		and Remarks		w	ш	PL	D
No.	Type	+	1	N	Depth			W	ш.	n	U
					المليل	Medium Dense, Light Yellowish Brown (2.5Y 6/4) Fine to Coarse SAND and GRAVEL, Little Silt					
9	SS	17"	М	26	E ₅₀ _	(SP-SM)					
•					1"T	End Boring at 50'					
				<u> </u>	F						
					F 55-		<u> </u>		<u> </u>		
					E.						
					E						-(
				\vdash							
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					80-						
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	1		V	AT		LEVEL OBSERVATIONS	GE	NER	AL I	NOT	ES
	nile Di on Co	-	No ——	ne	Orilling		Start	2/22/8	2 Com	plete.	/22/82 5 - 1
Tin	ne Af	ter C	Drillin		4 ho	<u>ur</u>	Drillie	ng Met	hod	ČS 0	-10'
	pth to			-	10.0			WO 10- 4") 0-		·•···	·····
De	pth to	o Ca	ve In	-			1				. /

ENGINEERING INC

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Baraboo, Wisconsin

Boring No. PBB-82-03
Surface Elevation 877.4
Job No. C 10313
Sheet 1 of 2

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	s	AM	PL	E		VISUAL CLASSIFICATION	SC)IL	PRC	P	ERI	TES
	Reco	wery		sture		and Remarks				ı	PL	0
Ne.	Type	→	+	N	Depth		1,				71	
		2á"		-		Dark Brown (10YR 3/3) Silt TOPSOIL		+	-			
	SS	24	М		[]	Stiff, Dark Brown (10YR 3/3) * Silty CLAY (CL)	1.5					
2	3"ST	12"	M	-	X,_	大会		ļ				
3	SS	21"	М	30		Medium Dense to Very Dense,						
4	SS	24"	M	71	E ₁₀₋	Light Olive Brown (2.5Y 5/4) Fine to Coarse SAND and GRAVEL,						
						Trace of Silt, Occasional Cobbles (GW)						
5	SS	15"	W	38	- - - 15-			-				
6	SS	15"	W	39	E ₂₀₋	Dense to Very Dense, Light Yellowish Brown (2.5Y 6/4)						
						Fine to Medium SAND, Trace Silt, Little Gravel, Occasional Cobbles (SP)						
7	SS	18"	W	101	- - 25-				\perp			
						Little to Some Coarse Sand & Gravel Encountered at						
8	SŞ	18"	W	151	E 30-	Samples 7 and 8.						
					E	·	()		ket P ding,			neter
				ļ	E	* Shelby Tube Pushed Hydraulically at 1400 PSI from 3' - 5'	-	-	+	\dashv		
		-			35 	**Dark Brown (10YR 3/3) Fine to Medium Silty SAND (SM)					, <u></u>	
					E.				\pm			
					E				+	+		
		-			45-							
						(Cantinued)				1		1

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

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	S	AM	PL	E	•	VISUAL CLASSIFICATION	so	IL PI	ROP	ERT	TES
	Rece	very	Meis	ture		and Remarks	•	w	ш	PL	B
No.	Туре	↓	↓	N	Depth			-		P.	, D
					F	Dense to Very Dense, Light Yellowish Brown (2.5Y 6/4)					
		ļ				Fine to Medium SAND, Trace					
9	cc	18"	W	22	ĘΙ	Silt. Little Gravel.	-		 		
<u>9</u>	33	18	W	32	- 50+	Occasional Cobbles (SP)			 		
					EI	End Boring at 50'					
					FI						
					E 55-						
					F.				ļ		
					EI						
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					ĿΙ						
					E80-						
					Εl		l i				
					Fl	•					
				<u> </u>	E85				-		
	·		W	AT	ER L	EVEL OBSERVATIONS	GE	NER	AL	TON	ES
Wr	ile D	rilling					_ Start	2/18/ Chief	8€om	plet2/	18/8
					Orilling_		_ Crew	/ Chief	LS F	Rig)-Z
	ne Af			ĸg.	8'DM			ng Met 010-		us U-	
	pth to pth to			-	₩) 0- n10-		•••••	· • · · · • • •



LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

Boring No. PBB-82-04
Surface Elevation
Job No. ... C 10313
Sheet 1 of 2

. 1409 EMIL STREET • P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (608) 257-4848...

	S	AM	PL	E		VISUAL CLASSIFICATION	so	L PF		ERT	IES
	Reco	wery	Mei	sture		and Remarks	Q.	w	ш	PL	D
No.	Type	+	↓	N	Depth					7.	
1	22	24"	М	19	E**		4				
Ė					F						
2	SS	18"	M	51	E ₅ _	Medium Dense to Very Dense,					
3	SS	15"	M	66	Ė	Light Yellowish Brown (2.5Y 6/4) Fine to Coarse SAND and GRAVEL,					
				ļ	-	Little Silt, Occasional Cobbles (SP-SM)					
4	SS	18"	M	101	E 10-	CODDIES (31-311)					
 5	cc	 18"	1.1	06	E						
-3-	33	18	W _	90	E 15-						
					E		_				
6	SS	18"	W	38							
				ļ	E	Dense to Very Dense, Light					
7	SS	17"	W	140	E ₂₅ _	Yellowish Brown (2.5Y 6/4) Fine to Coarse SAND, Trace					
					E	Silt, Some Gravel (SP)					
				ļ	Εl	•					
8	SS	18"	W	101	E 30-						
					E						
 -	-			<u> </u>			\longrightarrow				
}					35-						
					F	* Medium Dense, Dark Yellowish					
 ··	-			-	-	Brown (10YR 4/4) Fine to Coarse Clayey SAND, Trace		· <u> </u>			
-	-				-40-	Gravel (SC)					
					E	** 2' of Frost Present					
					45	. •					
					F						
						(Cantinued))

LOG OF TEST BORING

Project	Badger Army Ammunition Plant
Location .	Baraboo, Wisconsin

Boring No. PBB-82-04 Surface Elevation 881.0 Job No. C. 10313 Sheet 2 of 2

	S	AM	PL	E	•	VISUAL CLASSIFICATION	SO	IL P	ROPERTIES		
	Roce	very	Mei	sture		and Remarks			Ī		
te.	Type	↓	+	N	Depth			W	ш	PL.	D
					Lilia	Dense to Very Dense, Light Yellowish Brown (2.5Y 6/4) Fine to Coarse SAND, Trace					
)	SS	Χ	W	111	50	Silt, Some Gravel (SP)					
						End Boring at 50'					
				<u> </u>	E 55-	*** Less Coarse Sand & Gravel at 49'					
_					E 00 -						
					E-65-						
					70-						
					-75- -						
_					- 80-						
	-							· · · · · · · · · · · · · · · · · · ·			
	 			<u> </u>	-85- -ED	EVEL OBSERVATIONS	GF	NER		NOT	ES.
Up Tir	nile Di Ion Co ne Af	ompl ter C	etior	n of (Drilling.		_ Stari	2/22/8 Chief ng Met W0 10	Com	plete	/22/8

ENGINEERING INC

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Boring No. PBB-82-05
Surface Elevation 872.9
Job No. C 10313
Sheet of

	S	AM	PL	E		VISUAL CLASSIFICATION	SOIL PROPERTIES							
	Rec	every	Meis	ture		and Remarks	4.	w	ш	PL	0			
No.	Type	→	Ų.	N	Depth				ш	n	ע			
					E	10" Dark Silt TOPSOIL								
1_	SS	18"	М	16		Stiff, Dark Yellowish Brown (10YR 4/4) Silty CLAY (CL)								
2	3"ST	12"	M	-	K	Shelby Tube Pushed Hydraulically at 800 PSI from 3' - 5'	(1.7)		49.9	26.2				
3	SS	24"	М	7	E	*								
4	SS	30"	М	33	E.J	Dense to Very Dense, Light								
					E	Yellowish Brown (2.5Y 6/4) Fine to Coarse SAND and								
5	SS	18"	W	105		GRAVEL, Little Silt & Clay (SP-SM)								
					- 15- -									
			••	6-	E									
6	SS	9"	W	81	20-						·			
					E									
7_	SS	12"	W	67	E 25-	Namy Danes Light Valleyich		01	. 0					
					E	Very Dense, Light Yellowish Brown (2.5Y 6/4) Fine to Medium SAND, Trace Silt,	()	Pocke Readi			mete			
8	SS	15"	W	100	30-	Little Gravel (SP)								
					35-	 Loose, Dark Yellowish Brown (10YR 4/4) Fine to Medium 								
					E"]	SAND, Some Silt & Clay, Trace Gravel (SM)		_		!				
• •					E.		-				_			
					E 40 1									
						Very Dense, Light Yellowish Brown (2.5Y 6/4) Fine SAND,								
					-45-	Little Silt (SP-SM)								
	1					(Continued)								

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

Boring No. PBB-82-05 Surface Elevation 872.9

	S	AM	PL	E		VISUAL CLASSIFICATION	SC	IL PI	ROF	ERT	'IES
	Rece	very	Meis	ture		and Remarks			T		D
No.	Type	↓	\	N	Depth			•	u	PL	
						Very Dense, Light Yellowish Brown (2.5Y 6/4) Fine SAND, Little Silt (SP-SM)					
9	SS	17"	W	83	F.	Little Silt (SP-SM)					
					50	End Boring at 50'					
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					E 55 -						
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					E-85-						
			W	'AT	ER L	EVEL OBSERVATIONS		NER			
	ile Di on Co	_		of C	orilling.		Star	2/16/8 w Chief	2 LS	nplete	/16/82 55-2
Tin	ne Af		Prillin	a i	≰ hoūi 6'DM		ואט	/Wo ^M 8	-50.	(2 U	• 10'

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Boring No. PBB-82-06
Surface Elevation 866.8
Job No. C. 10313
Sheet 1 of 2

.1409 EMIL STREET • P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (608) 257-4646.

	S	AM	MPLE VISUAL CLASSIFICATION				SC		PRC	P	ERT	IES
	Reco	wery	Meis	سنت		and Remarks	4.	w	,	ш	PL	0
No.	Type	→	•	N	Depth	PYLL Plack (EV 2 5/1) Clavor	<u> </u>					
1	SS	24"	М	19	Ē	FILL: Black (5Y 2.5/1) Clayey Silt & Cinders						
2	SS	30"	М	9		18" TOPSOIL Stiff, Dark Brown (10YR 3/3)	(1.3	1			-	
					∇ -	Silty CLAY (CL)			士			
3	3"ST	24"	М	-		Dark Brown (10YR 3/3) Fine to Medium Silty SAND (SM)	<u> </u>	-	-			
4	SS	30"	М	58	<u>-</u> 10-							
					مليل	Dense to Very Dense, Light Yellowish Brown (2.5Y 6/4) Fine to Coarse SAND and						
5_	SS	18"	W	49	- 15-	GRAVEL, Little Silt & Clay (SP-SM)						
					1-1	Less Gravel at 15'	- ·					
 6	SS	18"	W	44								
					E							
7	22	18"	ы	92		Dense to Very Dense, Light Yellowish Brown (2.5Y 6/4) Fine to Medium SAND, Trace	-		+			
	-33			,,,	- 25- - -	Silt, Trace to Little Gravel (SP)	()	Pock Read				eter
8_	ŞŞ	16"	W	37		,						
						# Challes Takes Devaked						
					املما	<pre>* Shelby Tube Pushed Hydraulically at 1200 PSI from 5' - 7'</pre>						
••• • • • • • • • • • • • • • • • • •					40-	•						
					45-			_	\perp			
					 							
]		(Continued)	1					

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ENGIR	JEERIN	IG INC

WARZYN | LOG OF TEST BORING |

Baraboo. Wisconsin	
 ***************************************	Job No.
Badger Army Ammunition Plant	
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Boring No. PBB-	-82-06
Boring No. PBB- Surface Elevation	866.8
Job No	
Sheet2 of	

.1409 EMIL STREET • P.O. BOX 9636, MADISON, WIS. 53715 • TEL. (608) 257-4848

	S	AM	PL	E	•	VISUAL CLASSIFICATION	so	IL PI	ROP	ERT	'IES
	Rece		Meis			and Remarks		w	u	PL	D
No.	Туре	*	*	N	Depth -	Dense to Very Dense, Light Yellowish Brown (2.5Y 6/4) Fine to Medium SAND, Trace					
9	SS	16"	W	88	F.	Silt, Trace to Little Gravel (SP)			 		
					50 -	End Boring at 50'					
					E		<u> </u>	<u> </u>			
					F 55-			-	<u> </u>		
					E						
					F.,						
					- 60-						
					F		ļ				
					E-85-						
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					E 70-						
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					- 75-						
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					E-80-						
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	-				<u> </u>		<u> </u>				
	 			<u></u>	-85-	FVEL ORSERVATIONS	GE	NER	AL		rES
Up	WATER LEVEL OBSERVATIONS White Drilling Upon Completion of Drilling Time After Drilling ½ hour					Star Crev	2/16/8 w Chief	Com LS F	plete	/16/8 55 - 2	
De	pth to	o Wa	ter		8'DM		I DM/	WO 10- 4") 0-	50'	••••	



LOG OF TEST BORING

LUG	OF IESI BURING	Boring No. PBB-82-07
Project	Badger Army Ammunition Plant	Surface Elevation 865.4 Job No. C. 10313
Location .	Baraboo, Wisconsin	Sheet 1 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

	s	AM	PL	E		VISUAL CLASSIFICATION	so	IL PI	70 P	ERT	IES
	,	very				and Remarks	q.	W	ш	PL	D
No.	Type	•	+	N	Depth	12" TOPSOIL	-		-		
1	SS	18"	M	13	E	Stiff, Dark Brown (10YR 3/3)	(1.5)				
					₹ I	Silty CLAY (CL)					
_2	3" ST	18"	M	<u>-</u>	<u> </u>	**		<u> </u>			
3	SS	18"	М	33	E	**					
4	22	24"	M	55	- 10-						
-	33	٤٠,		55	-10-	Dense to Very Dense, Pale					
					E	Yellow (2.5Y 7/4) Fine to Medium SAND, Trace to Little					
5	SS	18"	W	44	-15-	Silt, Trace to Little Gravel,					
					-	Occasional Cobbles (SP-SM)					
					E	More Coarse Sand & Gravel					
6	SS	18"	W	56	E-20-	Encountered from 17' - 20'					
<u> </u>											
7	<u> </u>	18"	W.	96	25-	* Shelby Tube Pushed Hydraulically from 3' - 5' at 1100 PSI					
					<u>.</u>	**Dense, Light Yellowish					
8	SS	18"	W	83	30-	Brown (2.5Y 6/4) Fine to Coarse SAND, Little Silt					
					E 30	and Clay, Little Gravel (SP-SM)	()	Pocke			neter
<u></u>	<u> </u>				E			Readi	ng, T	SF	
					35-	·					
							-				
!					49-	·					
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					-45-	·					
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LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Boring No. PBB-82-07
Surface Elevation 865.4
Job No. ..C. 10313
Sheet 2 of 2

.1409 EMIL STREET + P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

	S	AM	PL	E		VISUAL CLASSIFICATION	so	IL PI	ROP	ERT	IES
	Rece	very	Mois	ture		and Remarks	4	w	ш	PL	ם
No.	Type	+	+	N	Depth					· · ·	
		i			F	Dense to Very Dense, Pale Yellow (2.5Y 7/4) Fine to	ŀ				
					Εl	Medium SAND. Trace to Little					
9	SS	15"	W	98	<u> </u>	Silt, Trace to Little Gravel, Occasional Cobbles (SP-SM)			 		
<u> </u>				-	E 50 -	End Boring at 50'					
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					85						
			W	'AT		LEVEL OBSERVATIONS	GE	NER	AL	TON	ES
W	ile Dr	illing	-				Start	2/16/	82 _{om}	plete	/16/82
		_		of [Orilling.		Crow	Chief	LS _	_{3:-} 5!	5-2
	ne Af				な hou 6'DM	<u>r</u>	_ Drillin	ng Met 10-	hod (S 0-	10.
	pth to			-	J DI'I			4") O-			
_De	pth to	Ca	e In	-			- [567.	T			<i></i>)

ENGINEERING INC

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Boring No. PBB-82-08
Surface Elevation 871.9
Job No. C 10313
Sheet 1 of 2

,1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

	S	AM	PL	E		\#0\ \A\	soi	L PF	ROP	ERT	TIES
	Rese	very	Mois	ture		VISUAL CLASSIFICATION and Remarks	G.	w	u	PL	D
No.	Type	+	♦	N	Depth		4"		ш	PL.	,
1_	SŞ	12"	М	41	1,1,1,1	Dense, Dark Brown (10YR 3/3) Fine to Coarse SAND, Some Silt & Clay Some Gravel (SM)					
2	SS	12"	М	42	<u>-</u> 5-	Medium Dense to Dense					
3	SS	12"	M	14	41414	Light Olive Brown (2.5Y 5/4) Fine SAND, Little Silt, Little					
4	SS	18	M	22	10-	Gravel, Occasional Cobbles (SP-SM)				·	
5	SS	12"	М	20	1-1-15-						
ر ا	ړې	16	IYI		15- - - - - - -						
6	SS_	12"	M	34	20-						
					بليليا	Dense to Very Dense, Olive Brown (2.5Y 4/4) Fine to Coarse SAND, Trace Silt,				-	
7_	SS_	8"	<u>M</u>	63		Little to Some Gravel (SP)					
8	SS	12"	M	60	بالمليا	More Gravel Encountered at 30'					
	-				- 30- - 1- - 1-	Hore graver Eliconnicted at 30					
			· ·		بليليل						
	_				49-						
					البليك						
					45-						· · ·
/						(Continued)					

WARZYN | LOG OF TEST BORING |

Project	Badger	Army	Ammunition	Plant	5
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Location	Dara	. 000	WISCORSIN		•

Boring No	o. PBB	-82-08
Surface		
		3
Sheet		

=1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

•	S	AM	PL	E		VISUAL CLASSIFICATION	so	SOIL PROPER			
	Rece	very	Mei	sture		and Remarks			1		
No.	Type	↓	↓	N	Depth		*	W	ш	PL	D
					1	Dense to Very Dense, Olive					
					F	Brown (2.5Y 4/4) Fine to Coarse SAND, Trace Silt,			ĺ		
				-	Εl	Little to Some Gravel (SP)	\vdash		ļ		
9	SS	12"	M	65	[_50-	*	-				
					F	End Boring at 50'	1				
				1	E				1		
				 	-	* Some Silt at 50'			 		
				╁─	[-55-		-				
					Εl		l l				
					F.						
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			W	/AT	ER	LEVEL OBSERVATIONS		NER			
	ile D				-		_ Star	2/17/8	32 . Com	plete	/17/82
				of [Drilling		_ Crev	v Chief	ig/MG	وiş	<u> </u>
Tin	ne Af	ter C	Drillir	ng j	a nou	<u> </u>		ng Met		CŠ 0-	· 10.
	pth t				20'		_ DM/W	0 10-! ") 0-	0'	•••••	
De	pth t	o Ca	ve In	١.			_	· · · · · · · · · · · · · · · · · · ·	:		

FIELD	BORING	LOG	Boring No. PBP-91-01
Project No.06853-03 Project	Name -BADGE	r AAP	Page of _4
Contractor LAYNE	Oritler & Bo	LILULZ Date started	10-12-91 completed 10-13-91
Method but wall Casing S			Protection Level >
Ground EL Soil Drit	led 253.5'	4 below ground 95"	Total Depth Z53.5'
Logged by RRR Chec	ked by DRP	Date 10/16/91	

•

Sample No	Depth in	Blows per 6 mones	Pen Rec	Description	Comments on Advance of Boring	-	nito	
	0-10'			TR. F SAND, PGD. (11)	DID NOT HAVE FUNCTIONING TIP OR HAV	JAR	_	LEL
	/o - Zo'			IT BROWN SAND, PUD, F, LITTLE M SAND, TR SILT, TR GBBIES	©			•
	Ze - 3e'			LT BROWN SAND, F.M., PGD, LITTLE C SAND, TR F GRAV., TIZ SILT, TR COBBILS	€P			ø
	30-40'			LT BROWN SAND, PUD, P. SOME M SAND, LITTLE SILT, LITTLE C SAND, TR F GRAVEL.	EP			o
	40 - 50			40-43': LT BROWN SAND PGD, M. SOME & SAND, LITTLE & SAND, TR GRAV, TR SILT. 43-50: LT BROWN SANOT GRAVEL, WGD, F GRAVEL,	V CHANGE			a
	50-GO			LITTLE C GRAVEL, M-C SAND, LITTLE & SAND. 50-53: SAME AS ABOVE 53-55: BROWN GRAVELY SAND, WGD, C, GRAVEL: F. 55-GO: LT BROWN SAND, WG C, SOME F ORAVEL, LITTLE M SAND, TR FSAND, TR COBBLES	S:0			G
		·	,					

FIELD	BORING	LOG	Boring No. PEP-91-91
Project No 06 853-09 Project	Name BANGE	R AAP	Page 2 of 4
Contractor LAYNE	Orners Rob	RIGUEZ Date started	10-12-91 completed 10-13-91
Method bush WALL Casing	Size 9" 0.15.	HNU 11.7/10.2	Protection Level 5
Ground El Soil Or	Wed 253.5	4 below ground 95"	Total Depth 253.5'
Logged by RRR Che	icked by DRP	Date 10/16/91	

.

Sample	Depth in	Blows per 6 inches	Pen Rec	* Description	Comments on Advance of Boring	Monito	LEL
	60 - 70'	·		LT BROWN GRAVELY SAND, WID, C. FGRAVEL, LITTLE M SAND, TR C. SANDGAYEL	(w)	TAR ATR	
	70-80°			TR. COBBLES. 70-73' SAME AS ABOVE 73-80 LT BROWN SAND, WILD, C, LITTLE M SAND, LITTLE, F GMYEL, LITTLE F GRAVEL COBBLES, TR	(S)		O.
	8 0-90'			F SANO. INTERBEDS OF LARLE COBBLES (4"-6" IN DIAM) 80 - 83': SAME AS ABOVE 83 -90': LT BROWN SANO PLD, F, SOME SILT, TH M SAND, TR F CRAVEL	CHANGE		
	90-100'			SAME AS ABOVE	EP 7 92.8		٥
	100-110			SAME AS ABOVE	©		٥
	110-120			LT BROWN SAND, 760, M., SOME F SAND, TR C SAND, TR F GRAVEL, TR SILT	GD .		
	/20-/30°			120-129' LT BROWN SAND WED, M, SOME C, LITTLE F SAND, TR F GROVEL 129-130: LT BROWN SAND,	54		٥
				F SAND, LISTLE F GRAV. TR GRAVEL COBBLES	10-12-91		
	130 -140			130-138 SAME AS 129-130	10-13-9,		

FIELD	BORING	LOG	Boring No. PBP-11-01
Project Noosy 53-og Project	Name BLE C	R AAP	Page 3 of 4
Contractor LAUNE	Ormer G Ran	RILUE & Date Started	10-12-91 completed 10-13-91
Method Dust Mil Casing S	120 9" QL	HNU 11.7/10.2	Protection Level
Ground EL Soil Oni	1ed 253.5	4 below ground 95'	Total Depth 253.5'
Logged by TETE Chec	xed by DRP	Date 10/16/91	

Sample	Depth in	Blows per 6 inches	Pen Rec	* Description	Comments on Advance of Boring	MO	_	rng
			-	- 30 SAIN 80N				LEL
,	138-140	·		138-140: LT BR SAID, PUB M-C. LITTLE F, TR FGMV, TR SILT	SP)	JAR	AI K	o
	140 450			140-146: LT BROWN SAND, PLD, F, SOME M, TR C, TR SILT	SP		o	•
	2			146-150: LT BROWN <u>SAND</u> , F WED, SOME M, LITTELC, TR F GRAVEL, TR SILT	HOTE !			
	150-160			LT BROWN SAND, WED, M. SOME C. LITTLE F GARY,	DIFFICULT DISTACTION Brun PCD		•	•
	160-170			SAME AS ABOVE	SUP MANESE		•	0
,	170-180			same As Abore	SEDIMENTS SW		٥	0
!	180-190			180-185 : SAME AS ABOVE 185-190 : LT BROWN SAND, WOD, M.C, SOME F GRAVEL, TR C GRAVEL, TR COBBLES, TR SILT, TR	(3)		0	O
	/90-30s		·	FEAND. 190-193: SAME AS ABOVE 193-198: LT BROWN CRAVELY SAND, WED, SAND: M-C, GRAVELIC, 198-200: LT BROWN SANDY CRAVEL, WCD, F-M, SAND: M-C, TR COBBLLS, TR F SANO, TR SILT	(GW)		0	0
		•						

FIELD	BORING	LOG	Boring No. 739-91-91
Project NOO6353-03 Project	Page 4 of 4		
Contractor LAYNE	Ormer & Rosa	CIEUE Z Date sta	rted 10-12-91 completed 10.13-91
Method WALL WALL Casing S		HNU 11.7/10.2	Protection Level 5
Ground EL Soil Dril	led_253.5	早 below ground	75' Total Depth 253.5'
Logged by ICCIC Chec	wed by DRP	Date 10/16/	/91

Sample	Depth in	Blows per 6 vicies			S 00	Mod				
		O WICHES	- TOC		~~~~		BU I'V	JAR /	_	LEL
	200.50			200 - 205: LT BROWN GRAVELY SAND, WCB, M.C.	હ્ય			-	-	•
				GRAVEL FOR THE CORRES	8					
•	210-224	!		GRAVELY SOND, WWD.	<u></u>			} }	٥	•
	}	1	}	same as ABOVE				1 1		
	· .			216-220: 47 BROWN	<u>@</u>					
		1	1	SANDY GRAVEL, WWO.				1 1		
			i	From F-M. Some C CRAVEL, SAND: M-C						
				THE COBBLES, TR & SAND				1		
]]	TR SICT.				1 1		
	220-230		,	220-223 LT BROWN						
	į		l	GRAVELY SUM , WED ,	(Em)			1 1		
				M-C, LITTLE F SONO					-	
				TR SIRT. TR COBBLES, CHAVEL F-M.		M	he c E			
				223 -= LT Brown, Pub				1 1	- 1	
				SAND, M. LITTLE C, LITTLE F. TR F GRAVEL TR SILT	(42)					
	230-240			Same As ABOVE	Ø)				٥	0
	240-25									
			}	240 - 247 : LT Brown	SP					Q
				THE GRAVEL				1 1		
				247.250, LT TSAM	\ \	<u>ر</u>	wez			
	•			Senor Graver, WED .				1 1		
				F-M, SWBIC-M,	(aw)			1 1		
į			İ	TR RINE, LITTLE GOBBL	Łs.				l	4
				B.o.B 253.5'	ľ					
			[0.0.0 255.5	f			1	ll	

FIELD	BORING	roé	Boring No. PBP-91-02
Project N006853-63 Project	Name BADG	TR ADP	Page _1 of _4
Contractor LATINE	Orster & Re	DELLUE Date started	10 - 13-91 completed 10 - 14-91
Method Sual Wall Casing			Protection Level D
Ground EL Soil On	400,253.5-1	4 below ground 95'	Total Depth 253.5
Logged by PLK Che	thed by DRP	Date 10/16/91	

Sample	Depth in	Blows per 6 inches	Pen	Description	Comments on Advance of Boring	Mor	
	0-10'			BROWN CLATEY SILT, PLD		JARA	LEL
				LITTLE & SAND	DONT HAVE		•
•	10-20'			LITTLE SILT, LITTLE M. TIZ COARSE. TR F GRAVE.	FONCTIONING HNU (SD)		•
	÷.			LATTEROWN SAND, POD, M LITTLE F, TR C. TR GRAVEL COARSE GRAVEL - COBBLE			
	70 - 30'			ZO-ZY: LT BROWN SAND, W M, PUD, AS ABOVE ZY-30'1 LT BROWN SAND			e
	30-40'			WED, M. LITTLE C, LITTLE F SAND, TR F GRAVEL, TR SILT LT BROWN SAND, WLD, M, SOME C, LITTLE F, TR F	SW		o
	40-50'			GRAVEL, TR C GRAVEL, TR SILT 40-46': LT BROWN SAND, WED, M-C, SOME F GRAVEL	<u></u>		٥
				CITTLE F SAND, TR SILT 46-50': LT BROWN GRAVELY SAND, WUD, C, SOME M, CRAVELY F, TR C, TR COBBLES.			
	50-60			50-55: BROWN SANDY GRAVE, WED. F. LITTLE M. C. SAND: C. LITTLE M. TR F. TR SILT 55-60: BROWN SANDY GRAVE	(A)		•
				Some m, TR F.			

FIELD	BORING	LOG	Boring No. PBP-91
Project No 06853-03 Project I	erne Barso	in AAP	Page Z of 4
Contractor LAYNE	Orster 6 Z	MIGUEZ Date Started	10 -/4.91 completed 10 -/5-91
Method Day LANK Casing S	20 9" O.D.	HNU 11.7/10.2	Protection Level
Ground EL Soil Onli	ed 253.5 '	4 below ground 95	Total Depth 253.5'
Logged by KKK Check	sed by DRP	Date 0/16/91	

Sample	Depth in Feet	Blows per 6 inches	Pen Hec	* Description	Comments on Advance of Boring	Monit	orng
	60-70	·		GO-G7': LT BROWN SAND WGD, C, SOME M, SOME F GRAVEL, TR C GRAVEL	6	JAR ATR	
•				67-70': Lr 73780WN SAND WLD TO PED, M-C, TR	TRIP OUT TO CURNOE FROM A CROWD-OUT		
	70-80			LT BROWN SAND, WLD, C. SOME M FAND, LIME F SAND, LITTLE F GRAVEL, TR COBBULS	TO A CROWN. W BIT. SW		o
	80-90'			LT TSBOWN SAND & POD, M. LITTLE C. LITTLE F, TR FGRAVEL, TR COSSILLS, TR			
	90-100'			SILT LT BROWN SAND, PUD, R.M. LITTLE SILT, TR C SAND.	©		6
: !	100-110			SAME AS 90-100' LT BROWN SAND, PUB, M.	STARTED USING WATCH DOWN		•
	/30-130	-		LITTLE C, LITTLE F, TR F GRAVEL. SP /20-122: SAMEAS 110-120' /22-729: LT BROWN SAND WLD, M, SOME C, LITTLE F, LITTLE F GRAVEL, TR COBRLES. /27-728': COBBLE-BOVIDE ZONE. /28-/30: LT BROWN GRAVELY SAND, WWD, M-C, LITTLE F, GRAVEL: F-M,	CASWE AT THIS POINT. CHAICE SW		
		·	٠	LITTLE COISBLES			

FIELD	BORING	LOG		Boring	NO. 75, C, 12
Project No.06855-03 Project N	ame ISANG	er AAP		Page	3 01 4
Contractor LAYNE	Onter & Re	RIGUEZ C	ate started	10 - 14-91 compl	eted /0 - /5 -91
Method DUAL WALL Casing Si				Protection Level	
Ground EL Soil Drilli	nd 253.5	4 perow	ground 95	Total Depth 25	3.5
Logged by DRR Check	ed by DRP	Date	10/16/91		

Sample No	Depth in Feet	Blows per F 6 inches F	10C	Description	Comments on Advance of Boring	MOF	utorng LEL
	/30-/40			130-136': LT TBROWN GRAVELY BAND AS ABOVE 136-140: LT BROWN SAND, WED, M-C, SOME FORWEL, LITTLE C GRAVEL, TR F SAND, THE SILT TRE GABLLS	(SW)	JARA	IR a
	140-150			LT BROWN SONS, WCS, M, SOML C, LITTLE F. LITTLE F GRAVEL, TR C CRAN			0
	150-160	15		SANDY GRAVEL, WCD, BROWN F, SOME C GRAVEL, SAND: M-C, TR FINE, TR SILT 156-160: LT BROWN GRAVELY SAND, WCD, M-C, LITTLE F, GRAVEL: F, TR COBBIES	(SW)		0
	160-170			LT BROWN SAND, PULL, M., SOME F. TR C., TR SILT	SP)		O
	170-180			SAME AS 160 -170	50	1	6
	180-190			180-184: LT BROWN SOND, PUD, M., SOME C., TR & GRAN TR F SAND. 184-190: LT BROWN SAND, WED, M.C., LITTLE & GRAVE TR F SAND, TR SILT.	SD v anne E		
	190 - 200			190-197's SAND, WGD	HEDVING SANDS AT THIS POINT VEL. SW		
	200 - T/O			SAME AS 197-200			

FIELD	BORING	LOG	Boring No PEP-91-02
Project No Chast's -03 Project	Name Basco	R DAP	Page 4 01 4
Contractor LAYNE	Driller GTG	DALLERE Date Started	10 - 124-91 completed 10 -15-91
Missing & LALLALL Casing	Size 7" o.b.	HNU 11.7/10.2	Protection Level 5
			Total Depth 253.5
Logged of PAC CH	ected by ORP	Date 10/16/91	

Sample No	Depth in Feet	Blows per 6 inches	Per	* Description		nents on of Boring	Monito	orng I LEL
	210-220 230-240 240-250			ZIO-ZIS: LT BROWN CRAVELY SAND, WED, C. SOME M, LITTLE F, TR SILT LITTLE COBBLES GRAVELI F, LITTLE C. ZIS-ZZO: LT BROWN SAND WED, C., SOME M, SOME F CRAVEL, LITTLE F SAND TR SILT. TR COBBLES. SAME AS 215-220 LT BROWN SAND, PGD, M, SOME C, LITTLE F SAND, TR F GRAVEL, TR SILT. 240-248: SAME AS 230- 240. 248-253: COBBLE-GRAVE ZONE.	(3) (G) (E) (CANAC	TAR ATR	
			·	•	,			

FIELD BORING LOG

Boring No.PBN-91-06C

Project No.06 353-05 Project Name BABLER AAP

Contractor Lawe Differ & Boring Date started 10 - 16-9; completed to - 22-9;

Method Dual Wall Casing Size 9"0.5, HNU 11.7/10.2 Protection Level D

Ground El Soil Orilled 220' I below ground 90' Total Depth 220'

Logged by RRR Checked by DRP Date 10/24/91

is.

Sample	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring			cud
20	0-10'	0		BROWN CLAYEY SILT, PCB. TR F SAND, COMESIVE		JAR		LEL
	10 - Zoʻ			LT BROWN SOME , WGD, M, SOME F, SOME C, LITTLE F GRAVEL, TR SILT	(Sig)		0	0
	50.30,			INTERBEDGED LT TOROWN SAND, WLD, C, SOME M, LITTLE F GRAVEL, TR SILT. TR C GRAVEL, TR F SAND; AND, LT BROWN SAND, PLO M, LITTLE C, LITTLE F, TR SILT.	SD		0	•
	30. HO			SIMIUM TO 30-40'	SW/SP		0	6
	40-50			LT BROWN SAND, WCD,C, SOME F GRAVEL, LITTLE C CLAVEL LITTLE M SAND, TRF, TR SILT. 13 ROWN GMVELY SAND, WLD C, SOME M, TR F, TR SILT GRAVEL! F, LITTLE C, TR	(38)		0	0
	50-60	54	-58	COBBLES SAME AS 44-50' LT BROWN SAND, WED, C. SOME FEGRAVEL, LITTLE M SAND, TR C GRAVEL, TR F SAND, TR SILT CRAVELY SAND AS 54-58'	(SW)		Ø	0
	60-70'	·		INTERBEDS OF LT BROWN SAND, WGD, C. SOME M. SOME F GRAVIL, LITTLE C GRAVIL AND; COBBLE ZONES			Ü	б

FIE	ELD BORING	LOG	Boring No. PSU-91-066
Project N006853-07	Project Name BAGG	ic aar	Page 2 01 2
Contractor LAWE	Driller & Yo	CONTINUES Date started	10 - 12-91 completed 10-22-51
Wedde prominent	Casing Size 9" O.D.		Protection Level D
Ground El	Soil Drilled 226'	4 below ground 90'	Total Depth 220'
LOGGES BY PARK	Checked by DR	P Date 10/24/91	

Sample No	Depth in Feet	Blows per F 6 inches 7	Pen Rec	Description	Comments on Advance of Boring			iEL
	70-80			LT BROWN SAND, WGS. C, SOME M, LITTLE F GRAVEL, TR F SAND. TR SILT TR COBBLES	(F)	JAR	AIR	•
	80-90	1		SAME AS 70-80 LT TS/COUN SAND, PGD, M, LITTLE C, LITTLE F, TR SILT	(S12) (SP) ▼ 90'		0	
	90-100			SAME AS 88-90	SP		0	9
	100 - 110			· · · ·	SP		•	0
	/10 - /2 0			LTBR SAND, WGD, M. SOME C. SOME F. TR FGRAVEL TR SILT TRECOTORILES	<u>S</u>		•	
	/20-130			BROWN SAND, WED, C, SO, F GRAVEL, SOME M SOND LITTLE C GRAVEL, TH CORB	(SW)		9	•
	130-140			SAME AS 120-130			٥	9
	140-158			TSTOWN GRAVELY SAND, WG C, SOME M, LITTLEF, GRAVEL: E, LITTLE TR COSSOLLS, TR SILT	SW)		•	
	150-160		Į.	LT BROWN SOUD, WGD, C. Some m, word F, corns F GRAVEL, TR SILT	SW BECOMES DARE BRO	لسد	0	•
	160-170			same 45 150 -160	(EW)		0	0
	190-180	/70 - 176 -	180	Same As ABOVE LT TEROWN SOND WGD, C, SOME F GABUTE, SOME M SOND, LITTLE F SOND, LITTLE C GRAVEL, TR COBBLES, TR SILT	(Siz)		o	0
	180-190			SAME AS 176-180	(514)		0	•
	190-200		7	SAME AS ABOVE	(50)	.	٥	-
	200 - ZIO			Brown Gravely SAND, WED, C SOME AN, CITTLE F, TR CORBLES. GRAVEL: F, LITTLE C	©		0	
	210-220			NO SAMPLE				

FIEL	D BORING	LOG	Boring No. PBN-91-06
Project Noogy53-03 Pro	HECT Name BANGE	R AAP	Page of
Contractor LAYNS			10 ./Z .9/ completed 10 -/2-9/
Method buy WALL CZ		HNU 11.7/10.2	Protection Level D
Ground EL Soi	Drilled 25/	4 below ground 83'	Total Depth 25/
Logged by PRR	Checked by DRP	Date 10/14/91	

No Feet 6 inches S-1 0-10' S-2 10-20	Rec	PGD, F. LITTLE M SAND, TR COARSE SAND, TR SILT. INTERBEOS OF SHE LENSES LY BROWN SAND, PGD, F, LITTLE M SAND, TR COARSE, TR F GRAVEL, TR SILT	<u>S9</u>	TAR O O O		LEL O
5-2 /0-20 5-3 20-30' 5-4 20-40' 5-5 40-50' 5-6 50-60 5-7 60-70		SOFT, MOIDERATE PUSTION 10-12': SAME AS S-1 2-20': LT BROWN SAND PUD, F. LITTLE M SAND. TR COARSE SAND, TR SILT. INTERISCOS OF SHIT LENSES LT BROWN SAND, PUD, F, LITTLE M SAND, TR COARSE, TR F GRAVEL, TR SILT SAME AS S-3 LT BROWN GRAVELY SAND WUD, M-C SAND, F-M	39 39	0 0	0 0 0 0	6
5-3 20-30' 5-4 20-40' 5-5 40-50' 5-6 50-60		2.20': LT BROWN SAND PGD, F. LITTLE M SAND. TR COARSE SAND, TR SILT. INTERTICOS OF SILT LENSES LT BROWN SAND, PGD, F, LITTLE M SAND, TR COARSE, TR F GRAVEL, TR SILT SAME AS S-3 LT BROWN GRAVELY SAND WGD, M-C SAND, F-M	E9 ED	•	0 0	9
5-4 20-40' 5-5 40-50' 5-6 50-60 5-7 60-70		INTERIOS OF SHE LENSES LY BROWN SAND, POD, F, LIFTLE M SAND, TR COARSE, TR F GRAVEL, TR SILT SAME AS S-3 LY BROWN GRAVELY SAND WOD, M-C SAND, F-M	I		0	0
5-5 40-50' 5-6 50-60 5-7 60-70		SAME AS 5-3 LT BROWN GRAVELY SAND WGD, M-C SAND, F-M				
5-G 50-G0 5-7 G0-70		WGD, M-C SAND, F-M	(S W)	0	٥	•
5-7 60-70			1			Į
		TR SILT. LT BROWN SAND, WLD. M-C, SOME FINE GRAVEL. TR F. SAND	©	•	0	0
5-8 70-80		SAME AS 5-6	500	•	0	0
	(St	70 - 73 : 56 - 57 : SAME AS 5-6 73 - 76 : COBIBLE + BOULDER	·	0	0	0
5-9 80-90'		ZONE. 2"-G" DIAMETER. SOME FINE SAND 7G-80? LT BROWN SAND PUD. F. TR M SAND, TR SILT. LT BROWN SAND, PUD. F. LITTLE M. TR COARSE SAND, TR F.M CRAVEL, TR SILT	SP - ▼ _83'	0	0	٥

FIELD	BORING	LOG	Boring N	O. PISN -
Project NoOGES'3-03 Project	Name BADG	er AAP	Page 2	of <u>3</u>
COMPACTOR LAYNE	Onlier GRo	Pricute Date started	10-11 - Ycompleted	10-11-91
Method DUN L WALLCasing !			Protection Level	
Ground EL Soil Dri	lled 25/ '	4 below ground 83'	Total Depth 257	
Logged by TRR Chec	ted by DRP	Date 10/14/91		

Sample	Depth in	Blows per 6 incres	Pen Rec	Description	Comments on Advance of Boring			orng
	}	O HIGHES	nec	ANU Fred to			LEL	
5-10	90-100			SAMI AS 5-9	(SP)	-		0
5-11	100.110			LT BIZOWN SAND , PCD , F,	SD)	6	0	0
5-12	110-120			LITTLE M, LITTLE SILT 110-112 + SAME AS 5-9				
				113-170 1 LT BROWN SA .	(3)	٥	0	0
				PGD. F.M. TR COARSE. TR F-M GRAVEL TR	SP)			
	-			ट्याउराइ ,		0	0	0
5-/3	120 -130			120 -122: SAME AS S-12				•
				122 - 130: LT BROWN SANDY GRAVEL, WHD, F-M GRAVEL				
				MIC SAND, TRACE SILT				
				LITTLE COBBLES,				
5-14	130-140			130-137: LT Brown	5B		0	0
				SAND , PUD, F.M, LITTLE				
4-15				137-140: LT BROWN SAND				
				PUD. F.M. LIFTLE CONESS.	(Se)			
		,		LITTLE F GRAVEL, YR COSSILL TR SILT	·			
5-15	140-150			LT BROWN SAND, WED, M.			٥	d
				SOMEINE, LITTLE C, LITTLE F GRAVEL, TR COBBLES,		٥	ľ	,
				TR SILT.				
5-16	150-160			LT BROWN SAND , NO F-M				
				SOME C, TR FGRAVEL, TR	(SP)	0	0	•
				SILT.	170'			
5-17	160-170			SAME AS S-16	SP SANDS	0	0	٥
					CHANGE TO			
		;		_	CROWD-IN BIT			
5-18	170 -180			LT BROWN SAND, WGB,	E''			
				M-C, SOME F SAND, LITTLE				
				F GRAVEL, TR SILT.				
						_1		

FIELD	BORING	LOG	Boring No. Por -91-069
Project No OGY53-03 Project I	ame BAOUE	r Are	Page 3 of 3
Contractor LAYNE	Onlier G Roba	CIGUEZ Date started	10-11-9/ completed 10-11-9/
Method Dut LUMIL Casing S	20 7"O.D	HNU 11.7/10.2	Protection Level 3
		4 below ground 83	Total Depth 251
Logged by TRRZ Check	ed by DAP	Date 10/14/11	

Sample	Depth in	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	_		rng
					WATER IS DANK	HA		LEL
5-19	180-190			SAME AS 5-18 (SW)	BROWN DUE TO	1	2	•
5-20	190 - 200	·		SAME AS 5-18 (SU)	SILT CONTENT	0	9	0
5-21	200 -210			PGD, M, SOME F, LITTLE		٥	٥	0
	Ę.			C SAND, TR GRAVEL, TRSILL 206-210': LT TIROWN SAND WGD, M-C, SOME F GRAVEL		٥	٥	٥
5.52	Z 10 • Z ZG			TR F SAND, TR SILT LT TBROWN SAND, PLD, F.M. LITTLE COARSE SAND, TR F GRAVEL, TR SILT	(SD)	o	o	0
5.23	220.230			L. BROWN SAND, PLB. M SOME C SAND, LITTLE F SAND, TR SILF, TR GRAVEL	(SI)	0	O	0
5-24	230 - 240			LT TSROWN SAND, PGD. F. LITTLE M SAND, TR. CORREE SAND, LITTLE	50	0	G	6
5-25	2 40 · 250			SILT. 240 · 245 : SAME AS 5-24 245 · 250 : LT BROWN GRAVELY SAND, WEB,		0	0	0
				M-C, LITTLE F SAND. GRAVEL IS F-C, TR LANCE GRBLES, TR. SILT.	نسک			
				BOE 250'				

	e e	erregion de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la compan	managan Taga salang d	The second second	ा _{पु} रु । १८१५	
	`	FIELD	BORING	LOG	Boring	Na 984-91-120
			Name BASS			013
					arted 10 - 23 -91 come	Heted /0- 23 -41
Metho	o Dune	WALL Casing !	Suze 9" 0,D.	HNU 11.7/10.2	Protection Leve	, D
Groun	d EL	Soil Om	ned 200'	4 below ground	Desta Zo	× ′
مووما	d by B	CR Cree	oxed by DRP	Date 10/2	16/91	

Sample	Depth in	Blows per			ents_on	Monitorna			
No	Feet	6 inches	Rec	Description	Jar	Advance	dvance of Boring		LEL
<i>0-10'</i>	-			BROWN CLAYEY SILT POD, TR F SAND, COUESIVE. LT BROWN SAND, WG C, SOME M, LITTLEF, LITTLE F GRAVEL, TR SILT. TUIN INTERBUS OF C GRAVEL AND COTSBELLS	ο,	(SW)		0	0
10-ZO				SAME AS ABOVE W/ THE MIN INTURBL OF COEBLES ENDING AT 14'	or	54)		0	0
20-50				LT BROWN SAND, PLA C, SOME M, SOME F, TR SILT, LITTLE F GR		SB		0	İ
30-40			~	30-32%- LT BROWN SAND, WLD, C, SOME M, SOME F GRAVEL, LITTLE M SAND. (32-40)- LT BROWN SAND, PLD, M, SOME C, TR F GRAVEL, TR F SAND, TR SILT		(3) (5)			
40-50	·	40.	-50	SAMS AS 32-40' LIT BROWN SAND, WHO, C, SOME M. LITTIS F GRAVEL, TR C CRAY, TTR R SAND, TR SILT		(3)		0	0
50-60				TO GRAVELY SAME TO GRAVELY SAME TO GRAVELY SAME TO GRAVELY SAME TO GRAVELY SAME	,	(3)		o	0

FIELD BORING LOG BORING NO. 784-91-120

Project No. 06853-03 Project Name BARGER AAP Page Z of 3

Contractor /AME Driller & BORKUE Date started 10-23-7 completed 10-23-91

Method Dual WALL Casing Size 9"0.0 HNU 11.7/10.2 Protection Level D

Ground EL Soil Drilled 200' 2 below ground 0/ Total Depth 200'

Logged by RR Checked by DRP Date 10/26/91

19.7 34.20

And the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second o

Sample	Depth in	Blows per	Pen Rec	Description	HNU	Comments on	Monitorng		
No	Feet	6 inches	Kec		jar	Advance of Boring	HNU	LEL	
60-70				M-C, LIFTLE & GRAVE TR & SAND.	• •	&	0	•	
70-80		70- 75-		LT BROWN SAND, PUD, M. LITTLE C, TR F. LT BROWN SAND, WOR		GD V	0		
	-	, ,		C, SOME M, CITTLE TO SOME F GRAVEL, TR COBBLES, TR CORAN	•	(W)			
go-90		8 4	-84	SAME AS 75-80 LT BROWN END, AU M, SOME F, LITTLE C.	2	9 9	0	0	
90-100				LT BROWN SAND, RO R, SOME M LITTLE SILT	•	SP	•	•	
100-110				SAME AS 90-100		(50)	-	0	
110-120				W 11 /1		(50)	0	•	
				•		(SP)			
/20 -/30				<i>''</i> '' ''		9	0	0	
/30 -/4e				LT BROWN TO BROWN SANDY GRAVEL. AND GRAVELY SAND, WED GRAVEL: F SOME TO LITTLE C. TR. COBBLE SAND: M-C. LITTLE TO TR. F. TR. SLT		(<u>3</u> (<u>3</u>	0		
140-150				LT BROWN SAND, WUD. C, SOME M, LITTLE F. LITTLE FURAVEL.		€®	0	6	
150-160				SAME AS ABOVE		€ ₩	٥	٥	
1 70-18- 160-170	<u>P</u> a	·		11 10 11.		(F)	a	•	

FIELD	BORING LOG		Boring Napha-91-120
Project No 06853-03 Project Na	ome Babber AA	ρ.	Page 3 of 3
Contractor LAYNE	Driver C ROBRIGUE	Date started 10-	23-91 completed 10 - 23-91
Method BUAL WALL Casing Siz	8 9" O.D. HAU	11.7/10.2 Prof	section Level /
Ground EL Soil Drille	d 200 7 b	now ground /01' Total	Destn Zoo'
Logged by TORR Checks	o by DRP	Care 10/26/91 1	

and the second second of the second

Sample	Depth in	Blows per	Pan Rec	Description	HAU	Comments on	Monit	
No	Feet	6 Inches	Rec	<u> </u>	.25	Advance of Boring	אאט	LEL
	170-180			IT BROWN SAND, WED, M-C, LITTLE F, LITTLE FERAVEL, TR SILT	(54)	Brown Due to Silt Contur	0	G
	180-190			SAME AS ABOVE	(Sw)		•	G
	/90 -200 -			SANE AS ABOVE CHANCING TO LT TBROWN SAND, PLD. M-F, LITTLE C	SP		•	0
		Bo	E	= 200 BGS				4
				•				
		·		. •				

FIE	ELD B	ORING	LOG		Boring	NO. PBN-91-12
Project N006853-03	Project Nan	* Brace	r AAP		Page_	of3
Contractor LAYNE	0	riller & Roa	ZICUEZ Dai	e started A	0-15-9/ comple	ted 10-16-91
Mestod DUALWALL	Casing Size	9" 0.D.	HNU 11.7/10	22	Protection Level	7
Ground El	Soil Drilled	231	T pelow g	round 161	Total Depth 231	۰۰۵
Logged by KRK	Checked	by DRP	Date	10/24/91		

Sample No	Depth in Feet	Blows per A	Description	Comments on Advance of Boring	Monitoring
S-1	0-10'		0.5': BROWN SILT, PLD, LITTLE & SAND, TR CORBU COUESIVE 5-10': LT BROWN SAND, WGD. M. SOME F SAND, SOME C, LITTLE & GRAVEL, TR COBBLES		JAR AJR
s-2	ιο-' ' 2Ω'		LT BROWN SAND, WED, M-C, SOME F, LITTLE F GRAVEL, TR COBBLES, TR SILT.	(SW)	0
5-3	20-70'		LITTLE F. TR F GRAVEL	SP	a
5-4	30.40'		LT BROWN SAND, FOOR TO MOD GRADED, SIMILAR TO 5-3. TUIN INTERBED OF GRAVEL,	(SP)	0
5-5	40-20,		SOME C, LITTLE F, TR F GRAVEL. BROWN SANDY GRAVEL WGD, F, LITTLE C SAND: SOME M, LITTLE F	5D ~ 60	0
S-G	50-60'		SAME AS 47-50' LT BROWN GRAVELT SAND, WED, C, SOME M, LIFTLE F, LRAVEL I FINE, TR C GRAV TR SILT.	(m)	0
s- 7	Co'- 70'	·	LT BROWN SOME , WWD, C, SOME M. SOME K GREV, UTTLE F SONO, TR SILT, TR COBBLES.	Sw	0

FIELD	BORING	LOG	Boring No. Pow-91-124
Project No.06853-03 Project	1 Name BASK1	ir AAP	Page 2 of 3
Contractor LAYNE	Oriller & Ros	Alwez Date started	10-75-91 completed 10-16-91
Method Dual WALL Casing		HNU 11.7/10.2	Protection Level \(\sigma\)
Ground El. Soul C	Juliag S 21,	4 below ground /6/	Total Depth 231
rodded ph KUU a	eased by DRP	Date 10/24/91	

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Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring		nitoring U I LEL
S- 8	구0'-80'	₹0-	‰ 30	LT BROWN SAND, PGD, C, SOME M, TR F SAND. LT BROWN SAND, WILL C, SAND, TR CARVEL, LITTLE M, SAND, TR COBBLE, TR F SAND, TR SILT.	(S2)	JAR.	
5-4	80-90'			LT BROWN SAND, PUB, CRADING FROM M TO F W/ DEPM. LITTLE TO TR C SAND TR COBBLES, LITTLE SILT		•	
5-10	90 - 100 '			LT BROW SAND, AB, F, LITTLE M, -ITTLE SILT, TR C, WET		°	
5-11	100-110'			LITTLE SILT, LITTLE M SOND	SP	٥	
5-12	110-120			SAME AS 100-110'	SP	٥	
5-13	/20 - /30			SOME F. LITTLE C, TR F GRAVEL	SP START PLAPAL	•	
5-14	/30-/46			Brown SANDY GRAVEL, WED F. LITTLE C GRAVEL GRADING TO SOME C GRAVEL. SOND: C, LITTLE M. LITTLE SILT, TR COBBLES.	HEAVING SYND	0	
5-15	/40 - 150			LTBROWN SAND, WGD, C, SOME M, LITTLE & GRAVEL, TR & SAND, TR SILT	હ્ય	0	
S-16	150-160	153	155 160	SAME AS 140-150 LT THOWN SAND, WUD, C. LITTLE M. SOME F CROVEL, TR F SAND, TR SILT	(3)	0	
5-17	160-176			SAME A 3 155-160	SW	0	
5-18	170-180			10 300 11 (410 110	A	0	
5-19	180-190	·		SAME AS 5.19	SW	0	

FIELI	D BORING	LOG	Boring No. Pen-51-126
Project No 66 453-ad Pro	HECT NAME BASIC	ea AAP	Page 3 of 3
Contractor LAYNE	Driller G Ros	SRIWE Date Started	10-15-51 completed 10-16-51
Method DUAL MILL COM	ing Size 9"0.D.	HNU 11.7/10.2	Protection Level
Ground El. Soll	Dulled 731,	4 below ground 101'	Total Depth 23/
Logged by KICR	Checked by DRP	Date (0/24)91	

Sample	Depth in	Blows per F	3	Description	Comments on			erng.
No	Feet	6 inches 7	स्टट	- · ·	Advance of Boring	HN	نصت	LEL
5-20	190-200			SAME AS 5-18		JAR	AIR	
. 21	200 - 210			LT BROWN SAND, PUD, M-C TR F GRAVEL, TR F SAND TR SILT	30	0		
5-22	210-220 :			SAME AS S-21 BROWN GRAVELY SAND, WGD. C. SONE M., TR.F., TR SILT TR COBBLES. GRAVEL: F, CITTLE C	51) Sw	0		
5-23	220-236			CT BROWN SAND, WED, MIC SOME F GRAVEL, TR SILT LITTLE F SAND, TRC GRAVEL		0		
				BOE = 231'				
·								
		·						

•	AP.
FIELD BORING LOG	BORING NO. PBN-5901 P
PROJECT NO.: 5753- 68 PROJECT NAME: USATHAMA- BAAP	PAGE / OF Z
DRILLING CONTRACTOR: LAYNE-NORTHWEST DRILLER: G. Redt	TIGHEZ DATE STARTED 1/19/89 COMPLETED 1/2/5
METHOD: DNAL Wall CASING SIZE: WHET = 9 8/4" TIP	eV: 10.07E PROTECTION LEVEL: D
	EL: 102' TOTAL DEPTH: Z40'
LOGGED BY: J. Snowden CHECKED BY:	DATE:

SAMPLE	DEPTH IN	BLOWS PER	PEN.	ACCCO LITTION	COMMENTS ON	MONI	TORIN
NO.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
5-1	0'-10'			Dr Br - In Isi m-fse w/ some and. gol, moist, med dense, wellgraded, nonplastic Sw	0-5 الموجهاد	0	
5-Z	10'-20'			similar to 5-1			
5-3	20'-30			Lt Br m-f sa w/trace si & little med numbed, sl. moist, bose, p. graded, nonplastic, intermittent Cgv1 (SP)	Change (a) 24		
5-4	30'-40			similar to 5-3		0	
5-5	40'-50			smiler to 5-3 N/> gr/ %		0	
5-6	50'-60'			HB m-f sa w/ trace to littlesi, was some muded gv1, sl. moist, med. dense, poorly graded, non-plastic SP	Change to high gul 70@55- 57'		
s-7	60-70			5/miler to 5-6 w/> msa (SP)		0,	
5-8	70'-80'			similar to 5-6		0	
5-9	80'-90'			similar to 3-6 60	***		
5-10	90'-100'			similar to 5-6 w/ in the med to L gvl %			
5-11	100'-110'			Cayla collabo (a)	I @ ~ loz'	0	
3-12	110-120			L+Br m-Fsa w/trace si+ little med to f gul, moist, lose, p. graded, nonplastic (SW)	112'		
5-B	120-140	- -		Similar to 5-12 w/ seturated moisture content		· '	

8.

FIELD BORING LOG

BORING NO. PERNSYSIE

NO.: 5753-08 PROJECT NAM	E: USATHAMA- BAAP	PAGE Z OF Z
DRILLING CONTRACTOR: LAYNE-NORTHWEST	DRILLER: G. Rodrigue Z DATE S	TARTED 1/19/89 COMPLETED 1/20/09
ETHOD: Due Wall CASING SIZE:	TE- 954 TIP W: D.O TE	PROTECTION LEVEL: D
GROUND ELEV.: 471.5 SOIL DRILLED: 2	140' WATER LEVEL: ~ 102'	TOTAL DEPTH: '240'
OGGED BY: J. Snapoden CHECKED	BY: DATE:	

SAMPLE	DEPTH IN	BLOWS PER	PEN.	Breco I DY I OU	COMMENTS ON	MON1	MON1TORING	
NO.	PEET	6-INCHES REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL		
5-14	130-140'			Similar to 5-12,3		۵		
5-15	140'-150'			Similar to 513 W/7,9VI		Ø		
5-14	150'-160			m. sandy gul w/ some & cob,	> in water yield from boring change 154'	70		
•	160'-170'			L+Br f-M Sa w/ little to trace Si + Trace med to f gv1, aret, losse, p. graded, non plastic (SW)	Change @) 162'	0		
To 8	170-180			similar to 5-17		0		
5-19	180-190'			Similar to 5-17		0		
5-20	190'-200'			similar to 5-17				
5-21	200'-210'			Similar to 5-17		0		
3-22	210'-220'			Similar to ST17		0		
5-23	220-230			smiler to 5-17				
5-24	236-240			similar to 5-17				
				BOB@ 240'				
		• :		308@ 240°		·		

FIELD BORING LOG PROJECT NO.: 5753-08 PROJECT NAME: USATHAMA- BAAP PAGE / OF 3 DRILLING CONTRACTOR: LAYNE-NORTHWEST DRILLER: GROWN DATE STARTED 3/18/89 COMPLETED 3/19/87 METHOD: CASING SIZE: 9" TIP ev: Tip - 7 PROTECTION LEVEL: D GROUND ELEV.: 894.5 SOIL DRILLED: 195' LOGGED BY: JB:55 CHECKED BY: 95' DATE: 3/15/39 3/24/89

SAMPLE	DEPTH IN	BLOWS PER	PEN.	ACCORIDIIAN	COMMENTS ON	MONITORING		
NO.	FEET	6-1NCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL	
S-1	0-105+			Black to dark brown fine silt grading to sand ut/depth. Topsoil-Loess + outured from	soil jammed in cyclone Topson 0-5.0	0.0		
S-2	10-2091			light brown to reddish brown Sine SAND at/ some silt and little crse Sandrgmel. dry. large gabbro boulder blown up at ~ 17 ft. gravel +cobbles to 205t. (SP)	4M 5/10	0.6		
S-3	20-305			Brown fine SAND and Gravel will some cobbles. Dry (SP)		0.5		
54	30-4051			similar to S3 (SP)		0.2		
55	40-50	,		Brown-light brown 5n-med SAND wt/some grave/+ occusional cobbles Dry (SP)	-	0.5		
56	50-60			light brown fu-ined Sand wt/ coarse sand and well rounded gravel. FLUVIAGED GIACIO-FLUVIA		0.1		
57	60-70			similar to S6 dry (BP)		0.3		
3-8	70-80 51			similar to S6 dry (SP) grading to fine to Crse Sand out/tree of Smi grave/ at 805%	3/14/89	0.8		

BORING LOG	3	BORING NO	PBN-89-02C	
MO.: 5753-06	PROJECT NAME: USATHANA-	BAAP		PAGE 2 OF 3
I (LLING CONTRACTOR: LAYNE-NORT	INNEST DRILLER:	Radviquez	DATE STARTED 3/15	3/89 COMPLETED 3/19/84
HETHOD: HEMMEN CASING	size: 9 in	TIP WI TIP-	7 PROTECTION	LEVEL: D
1 XIII ELEV.: 894.5 SOIL	DRILLED: 1951 W	ITER LEVEL: 120 t	TOTAL DEPTH	: 195'
L-JOED BY: J. BILSS	CHECKED BY:	DATE: 3	19/69 3/24	89

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WPLE	DEPTH IN	BLOWS PER	PEN.	DESCRIPTION	COMMENTS ON	MONITORING	
NO.	PEET	6- INCHES	REC.		ADVANCE OF BORING	TIP	LEL
5-9	80-90			light brown Fine SAND wt little fine Gravel+ Crse SANE dry-moist. fine-Med grave at 90 St.	P	0.0	-
5-10	90-1∞	·		Brown Fine-Cree SAND and Med-Cree Gravel, subangula Till. Dry		<i>0.</i> 8	
	100-110			Crose Sand and Sine to Crose Gravel, Dry	(GP)	0.7	
3-12	110-120			similar to S-1/est troe 5 50-Med Sand. Dry	k.P.		
				In-med Sandwit gravel at 11851.	vcharge e 118		}
3-13	120-130	• ·		Sn-mad Sand wit/ tree of	(4)	 F5 0.3	
5-14	130-140			brown Fine - med Sand		0.4	
3-15	140-150			Similar to S-14 more medium Sand	(SP)	0.4	
	150-160	·		brown fine-medium SAND with occasional med-crose gravel. wet.	(SP)	0.2	
S-17	160-174			similar to S-17		0.4	
		•			(4)		

FIELD BORING	LOG	E	BORING NO	PB	N-89-02	
PROJECT NO.: 5753- 08	PROJECT NAME:	USATHAMA- BAAP			PAGE	3 of 3
RILLING CONTRACTOR: LAY	ie-northuest	DRILLER: GRodrage	CZ DATE	STARTED 3/18	1/8	COMPLETED 3/19
ETHOO: hammer	CASING SIZE: 9"		TIP-7	PROTECTION L	ÉVEL:	D
GROUND ELEV.: 894.5	SOIL DRILLED:		1201	TOTAL DEPTH:	19:	5′
OGGED BY: J BUSS	CHECKED 8	r: Diff.	DATE: 3/	19/89 3/2	4/89	

SAMPLE	DEPTH IN		PEN.	Account of the second	COMMENTS ON	MONITORING	
HO.	FEET	6- INCHES	REC.	DESCRIPTION	ADVANCE OF SORING	TIP	LEL
5-18	170-180			Brown fine-med SAND wit occasional Gravel West	(4)	0.5	_
5-19	180-190			Brown Sine-med SAND wt little crose SAND++rce gravel. wet		0.4	
S-20	190-200			Brown Fine - med. SANO wt/little cyse sand	SP)	0.5	
				overdrilled to 210 ofter three try @ \$5-200		•	
	-					••	
	· .			·			
		·					

FIELD BORING LO	G		BORIN	G NO. <i>PB</i> A	1-89-04C
ROJECT NO.: 5753-0%	PROJECT NAME: USAT	HAMA- SAAP		PAGE	1 OF Z
RILLING CONTRACTOR: LAYNE-NO	RTHUEST ORTE	LER: G. Roeques	DATE STARTED	4/15/89	COMPLETED 4/16/89
ETHOS: AP-1000 Jan Casi	NG SIZE: 9.64	TIP ev: TE	10.6eV PROT		
CUNO ELEV.: 857.7 SCI		WATER LEVEL: + &	57 TOTA	L DEPTH: 190	
GGED BY: BUSS	CHECKED BY:	DATE:	4/26/89		

SAMPLE NO.	DEPTH IN	BLCUS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MCNIT	CR:NG
, NO.	/ FEE!	0 1NC.123	REC.	DESCRIPTION	AUVANCE OF BURING	1:2	II.
S*/	0-10			Black organic sitty typsoil and Brown Sitt (loess) to 5 St, Tan Sn Sand wt/ occ gravel to DFT moist	7IP BK.d= 0.0-0.5	0.1	
5#2	10-20			fn-med SAND wt/some crse sand + 5n-med gravel dry-moist (20)		0.0	
3	20-30			Tan Sn-med SAND wit occasional gravel (well rounded dry-moist. (SP)	d)	0.2	:
S×Y	30-40			same as S#3 (6P)		00	•
S * 5	40-50			Same as 5#3		0.1	
S#6	50-60			light brown In-Cree Sand with True Sine gravel dry-Moist (60)	coarsening	0.3	
S*7	60-70			brown Med to Crse SAND) wt/some In Sand + Tree Sine gravel (SP)		0.1	
S#8	70-80			brown Med - Cree Sand and Med to Cree Gravel well rounded dry-moist	(SP)	0.0	
5#9	80-90			brown Med Sand wt some Crse Sand + occ. gravel + Fine Sand	(50)	0.0	

FIELD	BORING	LOG		BORING NO. PBN-89	-04
PROJECT NO	.: ५७७३-०६	PROJECT N	IME: USATHAMA- BAAP	PAGE Z	
CRILLING C	CHTRACTOR: LAYN	E-ICETHUEST	ORILLER: G. BORRUEZ DATE	STARTED 4//S/89 COMPL	ETED 4//5/8
METHOD: A	P-1000	CASING SIZE:	TIP W: TE 10.6	ev PROTECTION LEVEL:	
CACUMO ELF	v.: 857.7	SCIL DRILLED:	190' wree LEVEL: ~875+	TOTAL DEPTH: 190°	
	Buss		1) BY: 8-8 4/26/89 DATE: 4/	15/89	
Z.Mer.Z	DEPTH IN	BLOWS PER	PEN.	COMMENTS ON	MCN (TCR) NG
MQ.	FEE?	6-INCHES	REC.	AGVANCE OF BORING	TIP LEL
510	90-100		Same as S#9 W	ret (sp)	0.0
SII	100-110		Brown En-med 51 Tree sitt.	9ND (50)	0.0
S# 12	110-120		same as S#11	(30)	0.0
			Jame as 5#11	(4)	0.0
-	120-130		brown In-mad SA	Most	0.0
5-14	130-140		acasional angular g cobbles at 140 st	raver range 14	1 1
S4 /S	140-150		Goarse - Fn. Grave Gbbles + a little Cree Sand wet.		0.0
5# <i>K</i>	150-160		Coase Sand and grades to 8 155 St grades to 8 Med-In SAND at crse SAND	From Johans acci	0.0
S* 17	160-170		Brown Med-5n with some Crse sand Since gravel as 168-170 st.	Sand	0.0
3418	170-180		Brown Sine Sand w Med. Sand + Tree S	ith some Site.	0.0
5#17	180-190		Brown Med Sandar Since crose Sand.	- oceasional	0.0
<u> </u>	Ll		Bother of him of O	(AP)	

ELD BORING	ELD BORING LOG				BORING NO. PBM8905				
PROJECT NO.: 5753-09	PROJECT NAME:	USATHAMA- BA	AP		PAGE	7 OF/	~		
DRILLING CONTRACTOR: LAY	NE-NORTHWEST	DRILLER: 人.	Newman	DATE STARTED 3/2/	189	COMPLETED 3/3/8	9		
METHOD: HSA	CASING SIZE: 6.25	- **	TIP ev: TE =2	10.00 PROTECTION	LEVEL: I				
GROUND ELEV.: 852.3	SOIL DRILLED: 90	WATE	R LEVEL: 81.4	TOTAL DEPT	H: 90 '	***			
LOGGED BY: J. Snow	Lei CHECKED B	Y: 500.	DATE:	1110189					

SAMPLE NO.	DEPTH IN	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	CCMMENTS ON ADVANCE OF BORING	MONI	TCRING
			REC.			TIP	LEL
8-1	2'-4'		20	Dr Brown si m-fse w/some w gvls little Csa, moist, med dense, poorly graded 0-5.0 Topsony SP	spoons were pushed softee rig rather then driven	0	
5-2	8'-10'		2.0	Tan f-m se n) trac s) & some oved gul, dry, 100se, p. graded nonplastic SP		•	
5-3	J2'-20'		捐	Simular to 5.2 W/7 gpt %		o:	
O.T.	27'-30		1.7	similar to 5-2 w/ for seams		D	
इ.र	38-40			Similar to 5-2		0	
06	48'-50'	S) for .	:5	Tan f-ms a w/sme C sa and, Egyl + cobs, dry-slimoist, pagratel, tress, remplastic (SP)	sproi wes when w/HD Hes hammer	0	
S-7	58-60'		1.6	Similar to 5-6 m/ > gvi+ C3a 90	spoon was pushed wythe rig	8	
3-8	68'-70'		华	similar to 5-6 N/< gv1+ cob		0	
3-9	78,-80,		1,24	similar to 5-8	I NOT executed	0	
5-10	17'-%'				Sencontered 9 = 31'		
				808 at 90.2'			
		u.					
		. 					

BORING NO. PBN-69-07 FIELD BORING LOG PROJECT NO.: 5753-PROJECT NAME: USATHAHA- BAAP OF ! PAGE COMPLETED 3/3/89 DATE STARTED 3/2/89 DRILLER: Dallas DRILLING CONTRACTOR: LAYNE-NORTHWEST METHOD: HSA CASING SIZE: 6.25" PROTECTION LEVEL: TIP eV: GROUND ELEV .: 846.6 SOIL DRILLED: 95 Feet WATER LEVEL: 77.2 Feet bos TOTAL DEPTH: 95 Feet

SAMPLE	DEPTH IN	BLOWS PER	PEN.		CCHMENTS ON	MCNI	TORING	
NO.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BCRING	TIP	LEL	
				0-2' bgs: black organic rich topsoil. 2-14' bgs: brown, sticky silt and fine sand. Moist LOESS W-95' Well to Floorly graded fine to ned. Sand with little gravel— Outwash Here overlanced to 110'				

BORING NO. 784-89-09 TELD BORING LOG PAGE PROJECT NO.: 5753- 08 PROJECT NAME: USATHAMA- BAAP COMPLETED 3/1/87 DRILLER: L. Newman DRILLING CONTRACTOR: LAYNE-NORTHWEST DATE STARTED 2/22/87 METHOD: 6.25" HEA CASING SIZE: 6.25" I.D. TIP ev: PROTECTION LEVEL: GROUND ELEV .: 880.6 SOIL DRILLED: 1751 WATER LEVEL: 110' I TOTAL DEPTH: 125' CHECKED BY: OFF. LOGGED BY: Johnson DATE: 500 PORTING SAMPLE COMMENTS ON DEPTH IN BLOWS PER MONITCRING NO. FEET 6-INCHES DESCRIPTION ADVANCE OF BCRING TIP LEL REC. No Sumples collected from PBM - 27 - 09 Longed buchde by ACTION OF MSA'S NOTE 0- 50' (M) 0-10.0' Come game! & many consect though decing 10.0' - 73' Smoon deining (2) To not appear to save my CORSUES OR BOULders - GA f GROW! MOST likely wed SORTED POW grave / BOMBS. Change @78' sumbreaus cosses (49) vary difficult deilling @ 97' Brace He Res .. HEA & TROPPED HEX Rols Down 2/25/89 the Grevare. whe Thy To Receive, Dut will HAVE B pull HSA out of Boring to get the Rads out. 2/20/59 2/20/07 Deman RII ALL AUJORS out of 93M-87-09 & PRETEIRE ALL HOL Rods. Apparently Ans Viberral our of the Hex Kods Account them to come spacer. Delicars Rin HSA BACK down to BB' & BARNE TOR LINCH.

FIELD BORING LOG	BORING NO. PAM-27-09					
PROJECT NO.: 5753- 65 PROJECT NAME:	CSATHANA- BAAP	PAGE Z OF Z				
BRILLING CONTRACTOR: LAYNE-MORTHMEST	DEILLER: L. NEWMAN DE	ATE STARTED 2 (22/67 COMPLETED 3/1)07				
METHOD: 6.05" MEA. CASING SIZE: 6.2	119 W:	PROTECTION LEVEL:				
CHOING ELEV.: 780.6 SOIL MILLED: 120	E, miles finer: 1087	TOTAL DEPTH: 125				
LOSSED BY: J. RELEASE CHECKED B	Y: MATE:					

i

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SAPLE	DEPTH IN	BLOVE PER	PEN.		COMMENTS ON	MON I	TORING
10.	PRET	6-INCHES	MC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
				Deveny from 75-105' Very difficult state many Corrects. Most likely Also consec Granel of Correct some. C 105' Tenning smooths out. Also out of the will get some their from the Press 22 by when they fill There was.	1514 (24) & 102 (104)	5	
	May Sop			4:30 Ze' of HSA FROM BRAT ARRIVE Q. F-10 RM DRILL FROM 105' TO 110' SMUOTH ANGARMY VERY ELRY. DRILL FROM 110' 10 115' VERY SMOOTH ANGARMY NO CARRIES CC. BOULDARS. 4:60	(SP)		
	z/ze/9			Then han 115 to 120' way Sware Daning Das nor Agram to de vary conservy -biles 7:45 pm	(~)		
				Rower Har Rads Fram. Badenous N20 8 @ 105' Have I 6' of "Marre" in Baner. Trusor 50 garants M20 Than D. TO 125' CHEEK Dapen of DAN HOLE TO 128' WAL NOW M3THELL MEN MW IN NSA.	erce		
			\	Dengard well pring in stratage to Ling Boom for Detrois - Rette Despiso well	on rand		

FIELD BORING LOG			BORING NO). PB	N-8710D
PROJECT NO.: 5753- PROJECT NAME	E: USATHAMA- BA	AP		PAGE	1 of 2
BRILLING CONTRACTOR: LAYNE-HORTHAEST	DRILLER: 6	ROORIGUEZ	DATE STARTED 3/5	189	COMPLETED 3 /7 /8
HETHOD: DUAL WALL CASING SIZE: 9.	1 1/2	TIP eV: 0.00	PROTECTION	LEVEL:	D 4/29/89
SHOUND ELEV.: 980.4 SOIL DRILLED: 7	2.65 WITE	R LEVEL: 115	TOTAL DEPTH	: Z8	5
LOGGED BY: D.H. BELAN CHECKED	87: स्ट्रिक.	DATE:			

SAMPLE NO.					COMMENTS ON ADVANCE OF BORING	MONITORING		
-	PERI	a-(inches	REC.	DESCRIPTION	AVANCE OF BOXING	TIP	LEL	
5-1	0-10'			DEBRN (SM) FROZEN, WITH LITTLE	1505014 0-5.0	0.00		
5-2	10-20'			MED BIEN (SM), LOOSE, SLIGHTLY DAMP, WITH TRACE 3 FAVEL		000		
5-3	20-30			MED BRN(SM) LOOSE, DAMP, TEACE OR	Wa (August 0.30)	0.00		
5-4	30-40			GRAVEL SOME	0	av, 0		
3-5	40-50'			ME BRY DP) WITH LITTE ORNEL LOOSE , MOIST		0.00		
-6	50-60			LT BON SF) WITH HITTEGENEL		0.0		
8-7	70-80'		+	LT BRU(SP) WITH TE GRAVEL		00.0		
				LTERNEP WITH SOME GW,	Ve 80	ලා _ට		
S-9	80-90'			(GW), WELL-HODBUTELY ROUNDER WITH LITTLE LITERNSF.		ಯಂ		
5-10	90 100			WITH WITH LT FRUET.	√@ 100°	00.0		
5-11	100 - 110			LT BRNEP) WITH SOME GW.	•	0.0		
5-12	110-120'			LTBENSP, WITH LITTLE GW.		0.0		
5-13	120-130			WET WITH TRACE GW.		00.0	 	
	130-140			SIMILAR TO 8-13	·	0.00		
	140-120'			LT BEN(SP) WOT, TRACE BUD.		۵0.0		
	450-160'			LT BRUEE , WITH SOME ON .	(0 110)	-		
5-17	160-1701			(GLD) BOLDED - AUGULAK, WITH INTERNATIONE SIZ ZONES.	€ 160'	∞ <u>.</u> υ		
-18	10 -90'			(GE) TO ~ 175 THEN PLOWING	Ve.115	6.00		
5-19	180-190			LTBEN SC-SW, WITH ENTILE		0.0		

FIELD BORING LO	G	BORING I	BORING NO. 1-BN-89-10 D			
PROJECT NO.: 5753-	PROJECT NAME:	USATHAMA- BA	MP		PAGE Z OF	2
BRILLING CONTRACTOR: LAYNE-N	ORTHUEST	DRILLER:	. Rodriguez	DATE STARTED 3/	5 84 COMPLETED	3/7/8
HETHOD: DUAL WALL CAS	ING SIZE: 9-		TIP eV: O. C	PROTECT	ON LEVEL: D	स्काङ
ENOUND ELEV.: 380.9 20	IL DRILLED: ZE	S WATE	ER LEVEL: 115	TOTAL DE	PTH: 255	
LOGGED BY: D.H.BELA	CHECKED &	1 H	DATE:			

5-20	PEET	6- INCHES		DESCRIPTION 1	ADVANCE OF BORING		
			REC.			TIP	LEL
	190 - 200			LT BRN (SP) WET, TRACE FINE GRAVER		000	
5-21	200 -205			IT BEN (SP.) WET, TRUCK FINE GENEL	-	∞ .o	
				UNABLE TO CONTROL HEAVING SANDS, ABANDON HOLE.	4/19/89 6	mple	for
	-			Many cobble boulder zones t	Hole wif AP. 19057.	1000	}
5421	200-210			brown mad-In SAND, Tree Crise Sand + 5:H. Occasional cobbles:		ð./	
S#22	210-220			smiler to S#21		0.0	
S#23	220-25			Brown med-In SAND, little Cree Sand and Sine gravel. mod-Cree Go	avel layerati	0.0	
524	ZJ0-246			Gray Sn. Cure SAND wit occasion gravel +		as	
S 25	240-250			similar to S#24, less gravel + crse sand		0.0	

FIELD BORING	LOG			BO	RING NO. 7	11-P8-M5	
PROJECT NO.: 5753-	PROJECT NAME:	USATHAMA- BA	AP .		PAGE	(OF (
RILLING CONTRACTOR: LAY	IE-NORTHWEST	DRILLER: TO	0N	DATE STA	RTED 3/3/89	COMPLETED 3/7/8	1
ETHOD: HSA	CASING SIZE: 6.7	_	TIP ev: 10.0 ev	~ 1u ibe	PROTECTION LEVEL:	~(
ROUND ELEV .: 881.6'	SOIL DRILLED: 128	3 feet WATER	LEVEL:	Seet bas	TOTAL DEPTH: 128	feet logs	
OGGED BY: B. Butler	CHECKED B		DATE:				

SAMPLE DEPTH 1		T 1 7 7 1		777 1 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			MONIT	
NO. FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL		
			[NO split spoons obtained] Lescriptions obtained from cutting Freedome of HEA during diction Encourage = 6.0' Locas - Topson 5.0-75 feet fine to medium sand, well to poorly graded with variable Lines, tr. gravel. tan 75-78 feet: Gravel, colobles 78-87.5' colobles - augen being refused at 80 feet. 87.5-178' tan fine to medium sand with little co. Such, fine-med.	(SP) (SP) cobbles (GP)	Bugh			
			G. SURT, FINE-DEL. Gravel. BOB @ 128' -Due to running sand the auger were removed from the ariginal borehole and and off set borehole was made a 15' west of the original boring. The offset boring was advanced to 125'.					

FIELD BORING LO	OG	BORING NO. FBN-89-123			
PROJECT NO.: 5753-	PROJECT NAME: USATHA	MA- BAAP	PAGE OF 2		
DRILLING CONTRACTOR: LAYNE-4	ICRTHWEST ORILLS	: G. Rodriquez 1	CETELAND PS/ 1/4 CETERTS STAD		
METHOD: AP- 1000 CLS	ing size: 9 in	TIP ev:	PROTECTION LEVEL: D		
GROUND ELEV.: 85. C. SC	DIL DRILLED: 1405+	WATER LEVEL: 859	TOTAL DEPTH: 140 ST		
LOGGED BY: JAB	CHECKED BY:	P 4/26/89 DATE: 4/	14/59		

SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	МСЯ	TORING
			REC.		- Stander of Scaling	TIP	1.2.
51	0-1051			light boows to take free erse SAND ist little. Sine angular grewy +	0-5.0 TOPSOIL	5.0	
SŽ	10-50			light brown Sin-mad SAND ist little Crac Sind + 5-mad Gravel-Moist (40		عد	
\$3	20 - 3 0			tan fine SAND wither crose Sand + fine grand slightly moist.		0.0	
54	30-40			Jame as S3		00	
3 3	90 -SO			Same as 53 dry (48)		00	
Sé	50-60			light brown 5n-med SANO with little Crose Sand - Since quarted slightly moist-dry		၁ .ల	
57	60-70				(57)	C.0	
2 2	70-80			light brown Su-med SAND, occusional Gravely slightly moist-dry	(67)	٠.٥	
S-9	80-90			SAND WT/ Evavel. T some for Suid, dry gireding to invist- wet leifow 25 5t.	(59)	0 0	

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT Badger AAP	DATE 11 and 14 Sep 35
LOCATION South of Probellans	DRILLERS 20th Eng Bde
Burning Ground	Geologist - Fox
DRILL RIG Failing 1500	BORE HOLE PEN-85-CLA
SAMPLE	

	SAMP LE TYPE		
(Feet) DEPTH	blows per 6 in	DESCRIPTION	REMARKS
0		Silt, very dark brown	
		Silt, with very fine grained sand, tan	
		Sand, nedlum to coarse grained with fime grave;	
4			
19-			
-			
4			
-			
4			
"			
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-	t	Send, medium to coarse grained and fine gravel	
7			
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AEMA Form 130, 1 Nev 82

Replaces HSHE Form 18, 1 Jen 88, which will be steel

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT .	Badger AAP	DATE -	14 Sep 85
LOCATION	South of Propellant	DRILLERS	20th Eng Bde,
Bursing Gr	ound	Geologias	- fox
DRILL RIG	Failing 1500	BORE HOLE	PBN-85-01A

	SAME LE TYPE				
(Poot) DEPTH	BLOWS PER 6 IN	DESCRIPTION	REMARKS		
Ō		Same as above			
_		•	·		
		1			
		Send, medium to coarse grained,			
°		with fine gravel (10%)			
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ASTA FORM 130, -1 Nev 82

DRILLING LOG (The proponent of this form is HSHE-ES)

P	ROJECT	Badger	· AAP	DATE -	14 Sep 85
L	OCATION	Sout	h of Propellant	DRILLERS	20th Eng Bde,
_	Burning	Ground		Geologi	st · Fox
D	RILL RI	G Fai	ling 1500	BORE HOLE	PBN-85-01A
		SAMPLE TYPE			
	(Feet) DEPTH	BLOWS PER 6 IN	DESCRIPTION		REMARKS
	60				
	-		fand madé: - to com		Drilling slower
	_		Sand, medium to coars gravel and cobbles	e grained,	priling store:
	70				
	-				
	-	•			
	_				
			Sand, medium to coars	e grained	
l					
I	80				
	-	l			
	4				
	깈				
	90				

DRILLING LOG

PROJECT -	Badger AAP	_ DATE	15 Sep 85	
	South of Propellant	_ DRILLERS	20th Eng Bde,	
Burning Gro	wnd	Geologis	t - You	
DRILL RIG	Failing 1500	- BORE HOLE	P3N-85-01A	

	SAMP LE TYPE		
(Feet) DEPTH	TYPE BLOWS PER 6 IN	DESCRIPTION	REMARKS
90		Same as above	
·-			
_			
_		Sand, coarse to fine grained with 20% fine gravel	
100			
_			
_	•		
110			
-			
-			
120			

AEHA Form 130, 1 Nev 82

Replaces HSH8 Form 78, I Jun 88, which will be used.

DRILLING LOG

PROJECT Badger AAP LOCATION South of Propellant Burning Ground		DATE		
•	South of Propellant	DRILLERS	20th Eng Bde,	
Surning Gre	ound	Geologia	t - Fox	
DRILL RIG	Failing 1500	BORE HOLE	PBN-85-01A	

(Page) DEPTH	Sample Type Blons Per 6 In	DESCRIPTION	REMARKS
£30		Same as above	
-			·
130	}	letter of fole	
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140	I		
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	I		
-	1		
150			

DRILLING LOG

PROJECT	Badger AAP	DATE lost 85
LOCATION	South of propellant	DRILLERS 20th Eng Bde.
Burning (round	Engineer - CPT Springer
DRILL RIG	Failing 1500	BORE HOLE PBN-85-02A

	SAMPLE		
	TYPE		
(Feet) DEPTH	BLOWS PER 6 IN	DESCRIPTION	REMARKS
0	PER B IN	Clay with silt, medium brown-gray	
J		Clay Vicin 111c; Boulan Grown Bray	
		•	
-			
10			·
		Sand with silt and some clay	
	. 1	Boulder	
-			
_			
20			
	1	Sand, medium to coarse grained	
_		and gravel	
	į		
-			•
-	l		
30			

AEHA FORM 130, 1 Nev 82

Repleces NSHE Form 78, I Jun 80, water will be used.

DRILLING LOG (The proponent of this form is HSH8-ES)

Burning Ground Engineer	- CPT Springer
DRILL RIG Failing 1500 BORE HOLE	P3N-85-02A

	SAMPLE TYPE		
(Feet) DEPTH	BLOWS PER 6 IN	DESCRIPTION	remarks
30		Same as above	
		•	
40			
		Gravel, with sand	
	.		
		Sand, fine to medium grained, with gravel	
	1		
50	ŀ	Sand, fine to medium grained	
-		sene, Tila to merini fretitad	
-			
-	. [Gravel, with coarse to fine grained sand	
60		•	·

DRILLING LOG

(The prepenent of this form is HSH8-ES)

PR	OJECT	Badg	er AAP	DATE	Oct 85	_
LO	CATION	South	h of propellant	DRILLERS	20th Eng Bde.	_
	Burning	Ground		Engineer	- CPT Springer	_
DR	ILL R	[6 <u>Fa</u>	iling 1500	BORE HOLE	PBN-85-02A	_
Γ		SAMF LE TYPE				
	(Feet) DEPTH		DESCRIPTION		REMARKS	
ſ	60		Sand, medium to fine with increasing grave	grained,		والمراجع
	-					
	-					
	-					
	70			·		
	_					
	-	٠				
	_		Sand, coarse to fine	grained		
	-					
١	80					
	4					
	4					
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AEHA Form 130, 1 Nev 82

Replaces HSH8 Form 78, I Jun 80, which will be used.

DRILLING LOG
(The preparent of this form is MSHB-ES)

PROJECT -	Badger AAP	- DATE 1 Oct 85	
LOCATION .	South of propellant	DRILLERS 20th Ene 1	de.
Burning Gr	ound	Engineer - CPT Springe	T
DRILL RIG	Failing 1500	BORE HOLE PBN-85-02	Ά

(Feet) DEPTH	SAMPLE TYPE BLOWS PER 6 IN	DESCRIPTION	REMARKS
90		Same as above	
-	1 1		
_		•	
]		
-			
00			
-		Gravel, with sand, medium to coarse grained	
10			
_			
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20			

DRILLING LOG

PROJECT -	Badger AAP	- DATE -1	Oct 85	
LOCATION	South of propellant	- DRILLERS	20th Eng Bde.	
Burning Gr	ound	Engineer	- CPT Springer	_
DRILL RIG	Failing 1500	- BORE HOLE	PBN-85-02A	

	SAMPLE TYPE		
(Feet) DEPTH	SAMPLE TYPE BLOWS PER 6 IN	DESCRIPTION	REMARKS
120		Same as above	
-			
-			
-			
130			
	1		
-	-		
4	į		
40	-	Bottom of Hole	
4			
4			
-			
4		•	
50			

DRILLING LOG

PROJECT	Badger AAP	DATE 3 Oct 85	
LOCATION	South of Propellant	DRILLERS 20th Ene Bde.	
Burning	Fround	Engineer - CPT Springer	
DRILL RIG	Failing 1500	BORE HOLE PRIN-45-034	

(Feet) DEPTH	SAMPLE TYPE BLOWS PER 6 IN	DESCRIPTION	REMARKS
0		Clay with silt, dark brown	
			·
_		Sand, coarse to fine grained	·
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10			
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20			
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_			
-			
30			

DRILLING LOG (The preparent of this form is HSHE-ES)

PROJECT -	Badger AAP	DATE 3 Oct 85	
LOCATION	South of Propellant	DRILLERS	20th Eng Bde
Durning G	round	Engineer - CPT Springer	
DRILL RIG	Failing 1500	BORE HOLE	PBN-85-03A

	SAMP LE TYPE		
(Feet) DEPTH	BLOWS PER 6 IN	DESCRIPTION	REMARKS
30		Same as above	
₩ —	-	Sand access to colling and the	
4		Sand, coarse to medium grained	
-			·
4			
4			
50 —			
4		·	
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10			

DRILLING LOG (The proponent of this form is MSHB-ES)

PROJECT -	Badger AAP	DATE 1 Oct 85	
	South of Propellant	DRILLERS 20th Eng Bde.	
Burning Gr	ound	Engineer - CPT Springer	
DRILL RIG	Failing 1500	BORE HOLE PEN-85-03A	

(5)	SAMPLE TYPE BLOWS PER 6 IN		
DEPTH	PER 6 IN	DESCRIPTION	REMARKS
60		Same as above	
			·
-			
70 —			
	-		
	•		
_			
		•	
80 —			
_		•	
•	1		
-			
90		·	

DRILLING LOG

PROJECT Badger AAP	DATE
LOCATION South of Propellant	DRILLERS 20th Ene Bde.
Burning Ground	Engineer - CPT Springer
DRILL RIG Failing 1500	BORE HOLE PAN-45-03A

	SAMPLE TYPE		
(Feet) DEPTH	TYPE BLOWS PER 6 IN	DESCRIPTION	REMARKS
90		Same as above	
		Bottom of Hole	
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AEHA Form T30. 1 Nev 82

DRILLING LOG

PROJECT -	Badger AAP	DATE 30 Sep 85	
LOCATION	South of Propellant	DRILLERS 20th Eng Bde.	_
Burning Gr	ound	Engineer - CPT Springer	_
DRILL RIG	Failing 1500	BORE HOLE PBN-65-04A	_

(Feet) DEPTH	SAMPLE TYPE BLOWS PER 6 IN	DESCRIPTION	REMARKS
0		Silt, dark brown	
_			
	·	Clay with silt, medium brown	
-			
10			
-		Sand, fine to coarse grained	
-	•		
-			
20 —			
-			
	}		
·			
30			

AEHA Form 130, 1 Nev 82

Register HSHS Form 78, I Jun 88, which will be used.

DRILLING LOG

PROJECT -	Badger ANP	DATE
LOCATION	South of Propellant	DRILLERS 20th Eng Bde.
Burning Gr	ound	Engineer - CPT Springer
DRILL RIG	Failing 1500	BORE HOLE PEN-85-04A

	SAMPLE		
	TYPE		
(Peet)	BLOWS PER 6 IN		
DEPTH	PER 6 IN	DESCRIPTION	REMARKS
30		Same as above	
1 1			
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40	İ		1
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1 1	. 1		
-	1		
	İ		
1 7	I		
	1		
7			
50	Ĺ		
	F	Sand, medium to coarse grained,	
	}	with gravel	
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60			

AEHA Form 130, 1 Nev 82

Replaces MSMS Form 78, I Jon 88, which will be used.

DRILLING LOG (The proponent of this form is HSH8-ES)

10

PROJECT LOCAT 10	N Sout	er AAP h of Propellant	DATE -3 DRILLERS	O Sep 85 20th Eng Bde.
DRILL RIG Failing 1500			BORE HOLE	- CPT Stringer PBN-85-04A
(Peet) DEPTH	SAMPLE TYPE BLOWS PER 6 IN	DESCRIPTION		REMARKS

DEPTH PER 6 IN DESCRIPTION REMARKS

Same as above

Sand, fine to medium grained

AEHA Form 130, 1 Nev 82

Replece MSMB Form 78, I Jun 80, which will be used

DRILLING LOG
(The proponent of this form is HSH 8-ES)

PROJECT -	Badger AAP	DATE 30 Sep 85		
LOCATION	South of Propellant	DRILLERS 20th Eng Bde,		
Burning Gr	ound	Engineer - CPT Springer		
DRILL RIG	Failing 1500	BORE HOLE PBN-85-04A	_	

(Toot)	SAMP LE TYPE BLOWS		·
(Feet) DEPTH	BLOWS PER 6 IN	DESCRIPTION	REMARKS
90		Same as above	
_			·
_			
100			
_			
4	•		
_			
4			
110		!	
		Bottom of Hole	
		•	

AEHA Form 130, 1 Nev 82

Replaces HSHE Form 78, I Jun 80, which will be used.

IELD	BORING	LOG			BORING	NO. 2811-3	9-123
PROJECT NO	i.: 5753-0 C	PROJECT NAM	E: USATHAMA- BA	AAP			CF 2
DRILLING C	CHTRACTOR: LAY	NE-NCATHUEST	ORILLER: 13.	Il melhoane	DATE STARTED	1/14/37 COMPL	STED 41/5/8"
METHOD: A	P-1200	CASING SIZE:		TIP ev:		ICH LEVEL:	
				ER LEVEL: 35	TOTAL O	SPTH: 140'	
	Buse		ay: 979. 4		ii		
	24 (3)	···················	// ()				
SAMPLE NO.	DEPTH IN	BLOWS PER P	En.	DESCRIPTION		COMMENTS ON ADVANCE OF BORING	MONITORING
		1	es.				TIP LEL
50	90-100				med SAN, nd Wet		CC
511	100-110			as 5 /6	>		
5 12	110-120		Sam	e as S		60	
S 13	120-13	5	Sam	e as S	10	60) 60)	
14	130-140				0 /30-/3	3	
			133- and	140 Crs	se SAND	160	
			1	BOE			
			ļ				

DRILLING LOG

(The proponent of this form is MSH 8-ES)

PROJECT -	Badger AAP	DATE	22 Sep 85
LOCATION -	South of Propellant	DRILLERS	20th Eng Bde.
Burning Gr	ound	Geologist	- Fox
DRILL RIG	Failing 1500	BORE HOLE	PBM-85-01

(Feet)	SAMFLE TYPE BLOWS	•	
(Feet) DEPTH	PER 6 IN		REMARKS
0		Silt, dark brown	1
_		Silt and clay, tan	
_		Sand, fine to coarse grained and fine gravel	
-			
10			
	-		
		Sand, medium to coarse grained and fine gravel	
20			
·			
30		•	

AEHA Form 130, 1 Nev 82

Replaces HSMB Form 78, I Jun 80, which will be used.

DRILLING LOG (The proponent of this form is MSHB-ES)

PROJECT. Badger AAP	DATE 22 Sep 85
LOCATION South of Propellant	DRILLERS 20th Eng Bde.
Burning Ground	Geologist - Fox
DRILL RIG Failing 1500	BORE HOLE PBM-85-01

	SAMP LE TYPE		
(Feet) DEPTH	blows Per 6 in	DESCRIPTION	REMARKS
30		Same as above	
	1		
	·		
-			
40			
_			
	•		
			·
50	T	Coarse to fine gravel with sand	
7		coarse to fine grained and cobble	
7			
4		•	·
4	1		
60			

DRILLING LOG
(The proponent of this form is MSH8-ES)

PROJECT -	Badger AAP	- DATE	22 Sep 85	
•	South of Propellant	- DRILLERS	20th Eng Bde.	
Burning Gr	ound	Geologist	- Fox	
DRILL RIG	Failing 1500	- BORE HOLE	PBM-85-01	

	SAMPLE		
(Feet)	TYPE		
DEPTH	PER 6 IN	DESCRIPTION	REMARKS
60			
_			
_			
		Boulder	Drilling very slow
-			
70		Gravel, coarse to fine, and sand, coarse to fine grained, with	Gravel caving into hole
		occasional cobbles	
_			
_	-		
_			
80			
		·	
		ļ	
•		1	
	İ	Sand, fine to coarse grained, and	
-		fine to coarse gravel	
90			

DRILLING LOG
(The proponent of this form is MSMB-ES)

PROJECT -	Badger AAP	DATE -	22 Sep 85
LOCATION	South of Propellant	DRILLERS	20th Eng Bde.
Burning G	cound	Geologist - Fox	
DRILL RIG	Failing 1500	BORE HOLE	P3M-85-01

	SAMPLE		
	TYPE		}
(2001)	BLOWS		
(Peet) DEPTH	BLOWS PER 6 IN	DESCRIPTION	REMARKS
90		Same as above	113 7 11113
			1
			· ·
	•		Š
	•		1
[ł		
7	-		
100	- 1		
	j		
	1		
	1		
	- 1		
1	ł		
Ì	L	Bottom of Hole -	
4		Porton or Hore	
110	į	ĺ	
1	į		
-	I		
i	Ì		
-	i		
•]	1		}
-			}
}	}		•
7	1		.}
		!	

AEHA Form 130, 1 Nev 82

Replaces MSMB Form 78, I Jun 80, which will be used.

DRILLING LOG
(The proponent of this form is MSHB-ES)

PROJECT Badger AAP OCATION South of Propellant	DATE 17 Sep 85 DRILLERS 20th Eng 8de.
Burning Ground	Geologist - Fox
ORILL RIG Failing 1500	BORE HOLEPBM-85-02
SAMFLE TYPE (Feet) BLOWS	

	SAMPLE TYPE	·	
	BLOWS PER 6 IN	DESCRIPTION	REMARKS
0		Silt, very dark brown	
_		Silt and sand, very fine grained, tan	
		Sand fine to coarse grained and fine gravel	
			·
10 ——			·
	-		
_			
20			·
_			
-			
30		-	

DRILLING LOG
(The proponent of this form is HSH8-ES)

PROJECT -	Badger AAP	- DATE -1	7 Sep 85
LOCATION South of Propellant		DRILLERS	20th Eng Bde.
Burning Gr	ound	Geologist - Fox	
DRILL RIG	Failing 1500	BORE HOLE	PBM-85-02

		والمنافذة والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ والمنافذ وا	ف منظم ورفون المساور المساور المساور المساور المساور المساور المساور المساور المساور المساور المساور
	SAMPLE TYPE		
(Feet) DEPTH	BLOWS PER 6 IN	DESCRIPTION	REMARKS
30			
_			
_			
_			
-		Gravel, coarse to fine with sand,	Drilling slower
40		medium to coarse grained and cobbles	
_			
-	-		
-			
-			
50			
		Gravel, coarse to fine and sand fine to coarse grained	-
	Ì		
_			
	i		
60			

DRILLING LOG
(The proponent of this form is MSHB-ES)

PROJECT Badger AAP		— DATE ——	7 Sep 85	
LOCATION	South of Propellant	- DRILLERS	20th Eng Bde.	
Burning Ground		Geologist	Geologist - Fox	
DRILL RIG	Failing 1500	- BORE HOLE	PBM-85-02	

	SAMP LE			٦
(Peet) DEPTH	TYPE BLOWS PER 6 IN	DESCRIPTION	REMARKS	
60				7
-				
_				1
	·	Sand, fine to coarse grained and fine gravel		1
/0		• • • • • • • • • • • • • • • • • • • •		
-				
-	-			
4				
	1			
80	1			
80				
7		·		
4				
4				
90		·	•	

AEHA Form 130, 1 Nev 82

Replaces HSHB Form 78, I Jun 80, which will be used.

DRILLING LOG
(The proponent of this form is MSM8-ES)

PROJECT -	Badger AAP	DATE 17 Sep 85	
	South of Propellant	DRILLERS	20th Eng Bde.
Burning Ground		Geologist - Fox	
DRILL RIG	Failing 1500	BORE HOLE	PBM-85-02

	SAMF LE TYPE		·
Feet) DEPTH	BLOWS PER 6 IN	DESCRIPTION	REMARKS
Ю		Same as above	
		·	
			·
-			
00		Bottom of Hole-	-
-			
4	•		
		•	
į			
7	Ì	•	
크	j		
4			
4			

AEHA Form 130, 1 Nev 82

Replaces HSHE Form 78, I Jun 20, which will be used.

DRILLING LOG (The proponent of this form is HSHB-ES)

PROJECT -	Badger AAP	- DATE	18 Sep 85
LOCATION	South of Propellant	DRILLERS	20th Eng Bde.
Burning Gro	ound	Geologiat	- Fox
DRILL RIG	Failing 1500	BORE HOLE	PBM-85-03

	SAMP LE TYPE		
(Feet) DEPTH	BLOWS PER 6 IN		REMARKS
		Silt, very dark brown Sand, fine to coarse grained, fine to coarse, gravel, some cobbles	Glacial Till (terminal moraine)
-			
_			
10			•
\dashv			
-	-		
-			
-			
20			
4		·	
7	- 1		
┥:	•	•	
30			

AEHA Form 130, 1 Nev 82

Replaces HSH8 Form 78, I Jun 80, which will be used.

DRILLING LOG (The proponent of this form is MSM8-ES)

PROJECT -	Badger AAP	- DATE	18 Sep 85
LOCATION -	South of Propellant	- DRILLERS	20th Eng Bde.
Burning Gro	und	Geologist	- Fox
DRILL RIG	Failing 1500	- BORE HOLE	PBM-85-03

			
ļ	SAMPLE TYPE		
(Feet)	BLOWS		
DEPTH	PER 6 IN	DESCRIPTION	REMARKS
30		the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the sa	No enno
30		Same as above	}
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40	1		
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Ì	.]	Sand, fine to coarse grained and coarse to fine gravel	
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DRILLING LOG

(The proponent of this form is HSHB-ES)

PROJECT	Badger AAP	DATE	18 Sep 85	
LOCATION -	South of Propellant	- DRILLERS	20th Eng Bde.	
Burning Gro	und	Geologis	t - Fox	
DRILL RIG	Failing 1500	- BORE HOLE	PBM-85-03	

	SAMPLE		
	TYPE		
(Feet) DEPTH	BLOWS PER 6 IN	DESCRIPTION	remarks
60		Same as above	
-			·
_			
70			
-			
-	-		
	,		
	Ī		
7	ſ	Sand, fine to coarse grained,	Drilling slow
80-	į	fine to coarse gravel and cobbles	
4	ĺ		
	L		
	İ	Sand, fine to coarse grained and fine to coarse gravel	
	.	TYNG CO COSISE SIGNAT	
90			
70			

DRILLING LOG

PROJECT	ger AAP	DATE .	18 Sep 85
LOCATIONSout	th of Propellant	DRILLER	20th Eng Bde.
Burning Ground		Geolo	eist - Fox

	SAMP LE TYPE		
(Feet) DEPTH	BLOWS PER 6 II	DESCRIPTION	REMARKS
90			Drilling slow, possible
			boulder
		Coarse to fine gravel, with sand, fine to coarse grained	·
			•
1 4			
1 -			
100			
	•		
1 +			
110			
-			
1 4			·
	Ì	Sand, fine to coarse grained, with fine gravel	
	ł	-	
120			

DRILLING LOG (The proponent of this form is MSMB-ES)

PROJECT	Bad	Rer AAP	DATE -	18 Sep 85
LOCATION			DRILLERS	20th Eng Bde.
Burning			Geologis	ist - Fox
DRILL RI	IG	iling 1500	BORE HOLE	PBM-85-03
,				
	SAMP LE TYPE			
(Feet) DEPTH	BLOWS PER 6 IN	DESCRIPTION		REMARKS
120		Same as above		
		Sand, very fine to co	carse grained	•
		with fine gravel		
-				
130				
		Sand, fine to coarse and fine gravel	grained,	
	-	·		
	1			
	Ì			
140	1			
-	1			
-	1			
-				
150	_]	Bottom of Hole		

AEHA Form 130, 1 Nev 82

Replaces HSHB Form 78, I Jun 80, which will be used.

DRILLING LOG

PROJECT -	Badger AAP	DATE 24 Sep	85
LOCATION	South of Propellant	- DRILLERS 20t	h Eng Bde,
Burning Gr	ound	Geologist - Fox	
DRILL RIG	Failing 1500	- BORE HOLE PB	M-85-04

-			و و و و و و و و و و و و و و و و و و و
· I	SAMPLE		
	TYPE		1
(Feet) DEPTH	BLOWS PER 6 IN	DESCRIPTION	DEMANUE
0	PER O TIC	Silt, dark brown	REMARKS
ľ			4
-		Sizt and clay with very fine	j
		grained sand, with gravel, tan	
1 -			
1 1			
1 -			1.
]]]	Coarse to fine gravel and sand,	}
-		coarse to medium grained	ì
1 1	j		
10	j		
1 1	1		
	1		
1 1			
-	• 1		
1 1	- 1	,	
1 -1	1_		
1 1	1	Sand, coarse to fine grained with	
-	i	fine gravel	
1 1		_	
20	1		
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30			

AEHA Form 130, 1 Nev 82

Replaces HSHE Form 78, I Jun 80, which will be used.

DRILLING LOG
(The proponent of this form is MSHB-ES)

PROJECT -	Badger AAP	DATE	Sep 85	
	South of Propellant	DRILLERS -	20th Eng Bde.	
Burning Gro	und	Geologist -	Fox	
DRILL RIG	Failing 1500	BORE HOLE -	PBM-85-04	

	lawa e		
	SAMPLE TYPE		
(Feet)	BLOWS	000000000000000000000000000000000000000	REMARKS
DEPTH	PER 6 IN		KEMAKAS
30		Same as above	
		•	
_			
40			
	}		
	-		
_			
	1		
50			
_			
- 1	- 1		
	· • •	Gravel, fine to coarse, sand,	
	į	fine to coarse grained with	
60	ľ	occasional cobbles	
		أعاري والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع	

DRILLING LOG
(The proponent of this form is MSMB-ES)

PROJECT -	Badger AAP	DATE -24	Sep 85
	South of Propellant	DRILLERS -	20th Eng Bde,
Burning Gr	ound	Geologist -	Fox
DRILL RIG	Pailing 1500	BORE HOLE	PBM-85-04

(Feet) DEPTH	SAMPLE TYPE BLOWS PER 6 IN	DESCRIPTION	remarks
60			
_			
_		Sand fine to coarse grained and	
70		Sand, fine to coarse grained, and fine gravel, occasional cobbles	
_	•		
-			
		•	
80			
90			

DRILLING LOG

The proponent of this form is HSHB-ESI

PROJECT Badger AAP	DATE	
LOCATION South of Propellant	DRILLERS 20th Eng Bde.	
Burning Ground	Geologist - Fox	
DRILL RIG Failing 1500	RORF HOLF PBM-85-04	

	SAMP LE TYPE		
(Feet) DEPTH	BLOWS PER 6 IN	DESCRIPTION	REMARKS
90			
100	-	Sand, fine to coarse grained, with fine gravel	
120			·

AEHA Form 130, 1 Nev 82

Replaces HSHE Form 78, I Jan 80, which will be used.

DRILLING LOG (The proponent of this form is MSM8-ES)

PROJECT Badger AAP	DATE 24 Sep 85	
LOCATION South of Propellant	DRILLERS 20th Eng Bde.	
Burning Ground	Geologist - Fox	
DRILL RIG Failing 1500	BORE HOLE PBM-85-04	

	CAMELE		
	SAMPLE TYPE BLOWS		
(Feet) DEPTH	BLOWS TH		
120	PER 6 IN		REMARKS
120		Same as above	1
		Bottom of Hole-	1
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AEHA Form 130, 1 Nev 82

Replaces HSH8 Form 78, I Jun 80, which will be used.

DRILLING LOG
(The proponent of this form is MSM8-ES)

PROJECT Badger AAP		DATE 28 Sep 85		
•	of Propellant	DRILLERS 20th Eng Bde.		
Burning Ground		Geologist - Fox		
DRILL RIGFat	ling 1500	BORE HOLE	PBM-85-05	
(Feet) BLOWS DEPTH PER 6 IN	DESCRIPTION		REMARKS	
70	Gravel, coarse to fin coarse to fine graine Sand, fine to coarse with fine gravel	d		
90 -				

DRILLING LOG
(The prepenent of this form is NSMB-ES)

PROJECT -	Badger AAP	DATE	
LOCATION	South of Propellant	DRILLERS 20th Eng Bde.	
Burning Gr	ound	Geologist - Fox	
DRILL RIG	Failing 1500	BORE HOLE PBM-85-05	

	SAMPLE		
l	TYPE		1
(Feet)	BLOWS PER 6 IN		1
DEPTH	PER 6 IN	DESCRIPTION	REMARKS
90		Same as above	
-			
1 7	1		
100	Ī	·	
-	1		
	.		
-			
1 1			
1 7	l		
	1		
	- 1		1
110		Bottom of Hole	}
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]		}	
	1	-	
	1	· }	1
120			

AEHA Form 130, 1 Nev 82

Repleces HSH8 Form 78, I Jun 80, which will be used.

DRILLING LOG

PROJECT Badger AAP LOCATION South of Propellant				DAIL -	4 Oct 85 20th Eng Bde,			
-	UCA) 10N Burning			DRILLERS 20th Eng Bde. Engineer - CPT Springer				
D	RILL RI	6 Pail	ling 1500	BORE HOLE	PBM-85-06			
	(Feet) DEPTH	SAMPLE TYPE BLOWS PER 6 IN	DESCRIPTION		REMARKS			
	0		Silt, with clay dark b	rowa		1		
			Silt with clay, medium	brown				
	10							
		-						
	-		Sand, fine grained, with	th.gravel				
	20							
	•							

AEHA Form 130, 1 Nev 82

Replaces HSH8 Form 78, I Jun 80, which wil! be used.

DRILLING LOG (The proponent of this form is HSHB-ES)

PROJECT Badger AAP	DATE 4 Oct 85
LOCATION South of Propellant	DRILLERS 20th Eng Bde.
Burning Ground	Engineer - CPT Springer
DRILL RIG Failing 1500	BORE HOLE PBM-85-06

	CAME C		
	SAMP LE TYPE	1	
(Feet)	BLOWS		į
	PER 6 IN	DESCRIPTION	REMARKS
30		Same as above	
1 -			
]]			
1 7			
			·
1 1	ļ		•
40	l		
	ŀ		
	I]
	·])
1 1	1	Gravel, coarse to fine, and	
	1	cobbles, with send	}
1			1
	j		
50			
7	- 1		
1 -1	. [
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1 7	L		
	ĺ	Gravel, coarse to fine, with sand	
]	- 1		1
	- 1		
60	_]		

AEHA Form 130, 1 Nev 82

Replaces HSH8 Form 78, I Jun 80, which will be used.

DRILLING LOG (The proponent of this form is HSHB-ES)

PROJECT -	Badger AAP	— DATE —	4 Oct 85
LOCATION	South of Propellant	DRILLERS	20th Eng Bde.
Burning Gr	ound	Engineer	- CPT Springer
DRILL RIG	Failing 1500	BORE HOLE	PBM-85-06

	SAMP LE TYPE		
(Feet) DEPTH	BLOWS PER 6 IN	DESCRIPTION	REMARKS
60		Same as above	
-	1		
_			
ļ	·		
_			
70			
-			•
	1	Sand, medium grained, with gravel	
ᅥ			
80			
İ		·	
	1		
\dashv			
ᆜ		}	
	-		
90		Bottom of Hole	•

AEHA Form 130, 1 Nev 82

Replaces HSHB Form 78, I Jun 80, which will be used.

LOG OF TEST BORING	PBM-82-01
LOG OF TEST BORING Project Badger Army Ammunition Plant	Surface Elevation855.7
Location Baraboo, Wisconsin	Job No

,1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

	S	AM	PL	E		VISUAL CLASSIFICATION	SOIL PROPERTIES		TES		
Ĺ	Reco	Recovery		Moisture		and Remarks	Qu	w	l u	PL	
No.	Туре	↓	+	N	Depth			"		''	
1	SS	13"	М	5	- *	Stiff to Very Stiff, Black (5Y 2.5/1) Clayey SILT (ML)	(2.0)				
2	SS	18"	М	7	E ₅ _	**					
3	SS	18"	М	11							
4	33	17"	M	19	- 10- - 1 - 1	Medium Dense, Pale Yellow (2.5Y 7/4) Fine to Coarse SAND, Trace to Little Silt & Clay, Some Fine Gravel (SP-SM)					
5	SS	18"	М	15	. 15- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1-	a oray, some rina araver (or only					
6	SS	18"	M	20	- - - 20-						
7	SS	15"	M	20				-			
8	SS	12"	М	19	Boring Completed to 30' on 2/10/82		Pocke Readi			neter
					35 - 49 - 45 - 45 - 45 - 45 - 45 - 45 - 4	* 2.0' of Frost Present **Loose, Dark Yellowish Brown (10YR 4/6) Fine SAND, Some Silt & Clay, Trace of Medium Sand (SM)					
						(Continued)					



LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

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SAMPLE			VISUAL CLASSIFICATION		SOIL PROPERTIES						
	Recovery Moisture			and Remarks	Qu	₩	LL	PL	a		
No.	Type	•	+	N	Depth				ļ		
					ŧΙ	Boring Completed from 30' - 100' on 3/18/82					
	-				Εl						
					E ₅₀ _	Unit: SAMS-2 Chief: Larry F.			<u> </u>		
					+				-		
	†				Εl						
9	SS	18"	M	129	 -55-	Very Dense, Yellowish Brown (10YR 5/4) Fine to Coarse SAND,					
					F	(10YR 5/4) Fine to Coarse SAND, Trace to Little Silt & Clay, Some Fine Gravel (SP-SM)					
					Εl	Some Fine diavel (SF-SH)					
					F 60						
					1						
					Εl				<u></u> .		
	_				<u>–</u> 65–			 			
		,			Ė						
					E l						
					E70-	•					
					E						
					E						
	 			<u> </u>	F ₇₅ -						
					E						
				ļ	<u> -</u>	Very Dense. Light Yellowish			.		
10	_SS	18"	M	12	E 80-	Very Dense, Light Yellowish Brown (10YR 6/4) Fine to Medium SAND, Trace Silt (SP)		<u> </u>			·· -
					E	Hedrum SAND, Trace Stit (SF)					
					F						
	 		}		E 85-						
					E						
	╽				₽ 1						
	ļ			<u> </u>	E-90-			- .			
].										
			 	ļ		(Continued))



LOG OF TEST BORING

Project Badger Army Ammunition Plant
LocationBaraboo, Wisconsin

Boring N	PBM-82-01	
	Elevation C 10313	
	3 of	

-1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

	S	AM	PL	E		VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	IES			
	Recovery Maisture No. Type 7 N Depth					and Remarks	Qu	w	l LL	PL	0			
No.	Type	+	•	N	Depth		<u> </u>							
					<u>-</u>					<u> </u>				
					E		<u> </u>							
					<u>⊢</u> -95~					<u> </u>				
						Medium Dense, Yellowish Brown (10YR 5/4) Fine to Medium SAND,								
11	SS	18"	W	16	-	Trace Silt (SP)			<u> </u>					
					100	End Boring at 100'								
					E									
					105									
					_									
					-110· -									
			İ											
					<u></u>									
		_			-115									
					E.									
					- -120									
					E120				_					
					E	•								
					_ -125									
					- 123									
					E									
					- -130									
	, ,	1	W	ΆΤ	<u>'</u>	LEVEL OBSERVATIONS	GE	NER	AL	10N	ES			
Wh	While Drilling								2 Com	plete	/18/82			
Up	Upon Completion of Drilling								Start 2/10/82 Complete 3/18/82 Crew Chief MG/MG 55-1 Drilling Method CS 0-10'					
	ne Af oth to			- כ		Drilli FA	ng Met 10-30'	hod (-بر د,	iù.				
	oth to			-	30.0	Moist		WO 30-			······			

LOG OF TEST BORING

Project .	Badger Army Ammunition Plant
	Baraboo, Wisconsin

Boring No. PBM-82-02
Surface Elevation 870.9
Job No. C 10313
Sheet 1 of 3

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	S	AM	PL	E		VISUAL CLASSIFICATION	so	IL PI	ROP	ERT	TIES
Recovery		very	Moisture			and Remarks			T		
Ne.	Type	+	+	N	Depth		•	W	ш	PL	0
1_	SS	18"	M	-	<u> </u>	12" TOPSOIL			-	ļ	
2	SS	18"	М	12		Very Stiff, Dark Brown (10YR 3/3) Silty CLAY (CH)	(2.2			-	
3	3"ST	12"	М	-	X,_	Shelby Tube Hydraulically			52.3	25.8	
					₽	Pushed at 100 PSI from 3'-5'	┿				
4	SS	18"	_M_	111	Ė i		 		ļ		
5	ŠS	24"	M.	49	E ₁₀ _						
											ļ
					Ę I						
6	SS	18"	М	26	上 ₁₅ _	Medium Dense to Very Dense,		· .			
					E	Light Yellowish Brown (2.5Y 6/4) Fine to Medium	}				i
					Ė.	SAND, Trace to Little Silt & Clay, Little Coarse Sand	L				
7	ss	18"	M	52	E ₂₀ _	& Fine Gravel (SP-SM)					
					F			- 1)			
					Εl						
8	SS	6"	M	37	E ₂₅ _		L				
					E						
					F	•					
.9	.ss.	4"	M	44	E30-	Some Fine Gravel Encountered at 29'		-			
					E	Boring Completed to 30' on 2/10/82		Pocke	t Per	etro	meter
					<u> </u>	* 1' of Frost Present		Readi	ng, 1	SF	
					-35-						
		j			E	<pre>**Medium Dense, Dark Brown (10YR 3/3) Fine SAND, Some</pre>					
					FΙ	Silt & Clay, Trace of Medium					
- (E40-	Sand (SC)					
					<u> </u>			i			
					FI		·				
					45-						
					「						
						(Continued)					



LOG OF TEST BORING

LOG OF TEST BORING	PBM-82-02
Project Badger Army Ammunition Plant	Surface Elevation 870,9
_ocation Baraboo, Wisconsin	Sheet 2 of 3

. 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

SAMPLE Recovery Moisture						VISUAL CLASSIFICATION	so	L PF	ROP	ERT	IES
No.	Reco	t i	Moi	sture	Depth	and Remarks	qu	w	LL	PL	0
	.,,,,				50-	Boring Completed from 30' to 115' on 3/17/82 Unit: SAMS-1 Chief: Larry F.					
10	SS	18"	М	106	55-	Very Dense, Light Yellowish Brown (10YR 6/4) Fine to Medium SAND, Trace Silt, Trace Gravel (SP)					
					- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1						
					65-	•					
					75 -						
11	ss	18"	M	120	Very Dense, Yellowish Brown (10YR 5/4) Fine to Coarse SAND, Some Gravel, Trace Silt, Occasional Cobbles (SP)					
					85- - 85- - - -						
					90-	(Continued)				- 🐠	· · ·



LOG OF TEST BORING

Project	Badger	Army	Ammun	ition	Plant
	•				

Location Baraboo, Wisconsin

Boring N	o. PBM	-82-02
	Elevation	
Job No.	C 10313	
Sheet	3 of	3

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

	s	AN	IPL	E		VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	TES
	Rec	overy	Mois	sture		and Remarks	Qu				
No.	Type	+	+	N	Depth		4.	W	ll	PL	D
12	SS	18"	W	173	100-105-115-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	Very Dense, Light Yellowish Brown (10YR 6/4) Fine to Medium SAND, Trace Silt, Trace Gravel (SP) End Boring at 115'					
					125						
			14	Λ.	-130 	EVEL ORSEDVATIONS	C	NED	<u> </u>		EC
Upo Tirr Dep	ile Dr on Co ne Af oth to oth to	mple ter D	etion Prilling	of E	Prilling.	ur	Start Crew Drillir FA 1	2/10/8 / Chief ng Meti 0-30! 10 30-1	Comp LS R	3/1 plete	7/82

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

1499 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

	SAMPLE Recevery Meisters					VISUAL CLASSIFICATION	so	SOIL PROPERTIES						
	Recovery No. Type		Meis	stere		and Remarks		w	u	PL	D			
Ne.	Type	↓	↓	N	Depth	12" TOPSOIL	Q -		ш	PL	U			
1	SS	18"	М	7	التاليا	Stiff to Very Stiff, Dark Brown (10YR 3/3) Clayey SILT (ML)	(2.0							
2	SS	17"	М	6	<u> </u> - - 5 -	*		ļ						
3	SS	15"	М	10	1			1						
4	SS	18"	М	39	10-									
5	SS	13"	M	25	<u> </u>	Loose to Dense, Light Yellowish Brown (2.5Y 6/4) Fine to Coarse SAND, Trace to Little Silt & Clay, Little Fine to Coarse Gravel (SP-SM)								
6	SS	12"	M	40	 									
7	SS	18"	М	44	- - - - - - - -									
8	SS	7"	М	28	Boring Completed to 30' on 2/10/82								
	•				35-	* Loose, Dark Brown (10YR 3/3) Fine SAND, Some Silt & Clay, Trace of Medium Sand (SC)	() [ocket eading	Pene	trome F	ter			
					45									
						(Continued)								



LOG OF TEST BORING

Project

Badger Army Ammunition Plant

Location

Baraboo, Wisconsin

PBM-82-03
Boring No.
Surface Elevation 862.7
Job No. C 10313
Sheet 2 of 3

_ 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848_

	S	AM	IPL	E	.	VISUAL CLASSIFICATION	SOI	L PF	ROP	ERT	IES
	Recovery Moisture			and Remarks	qu	W	IL.	PŁ	0		
No.	Type	+	+	N	Depth					r.	U
				ļ	E	Boring Completed from 30' to 107' on					
	-			ļ	Εl	3/16/82					
	 			\vdash	FΙ	Unit: SAMS-1					
	┼─- ┤			 	F50-	Chief: Larry F.				_	
					Εl	•					
					Εl	Very Dense, Light Yellowish					
9	SS	18"	M	177	- -55-	Very Dense, Light Yellowish Brown (10YR 6/4) Fine to Medium SAND, Trace Silt,					
					E_{1}	Trace Gravel (SP)				j	
					FI						
	 			-	Εl						
	 -			 	-60-	•	-				
					EI						
					FI				<u> </u>		
			T -	Γ	E ₆₅						
					Eod						
					F	·					
	-		 	-	Εl						
			 	┼—	[70-						
					E						
				Ī	75 -	•					
					E′57	•					
					F 1						
	-				Εĺ	Very Dense, Yellowish Brown					
10	SS	18"	<u>M</u> .	130	E 80-	(10YR 5/4) Fine to Medium	 		 		
]		El	SAND, Little Silt, Trace Gravel (SP-SM)					
					FI						
	[]				F						
	T - 1		_		E 85-					1	
					F 1						
	-		<u> </u>	-	Εl	· 	-		 		
	}		 	├	- 90-					-	
				1	1 1	(Cont [:] riued)				j	



LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Boring No. PBM-82-03
Surface Elevation 862.7
Job No. C. 10313
Sheet 3 of 3

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<i>-</i>	S	AM	PL	E		VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	IES
	Recovery Moisture O. Type + N Depth			and Remarks	qu	w	LL	PL	B		
No.	Type	+	+	N	Depth		ļ ·	"			
					95-		-				
					E						
					E100						
			-		105						
11	ss	12"	W	132	<u> </u>	Trace Silt, Trace Gravel (SP) End Boring at 107'	-				
			_			end Boring at 107					
-					E110						
					115	No Mud Loss During Drilling Operation					
					E						·
					E120						
					_ -125						
					E						
					130						
			W	'AT	ER	LEVEL OBSERVATIONS		NER			
Up		mpk	etion		Drilling.	ır	Crev	2/10/8 v Chie¥	G/MG _F	Ria . 5	5-1
Time After Drilling Depth to Water Depth to Cave In 30.0'Moist				_			FA	ng Met 10-30 /W0 30	-107'		

LOG OF TEST BORING

Project	Badger Army	Ammunition	Plant
Location	Baraboo,	Wisconsin	

Boring No	PBM-82-04	
Surface Ele	vation 869.0	
	C. 10313	
Sheet]	of 3	

_1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

	S	AM	PL	E		VISUAL CLASSIFICATION	SC	IL	PF	ROP	ERT	TIES
	Res	мегу	Mei	store		and Remarks	•	T	w	ш	PL	0
No.	Type	↓	+	N	Depth				"		PL.	
	66	3.0"	•	120	<u> </u>	Stiff, Dark Brown (10YR 3/3) Silty CLAY (CL)		+-				-
1	22	18"	M	10	Εl		(1.4	+				<u> </u>
2	SS	18"	М	7	Ē, J	Loose to Dense, Yellowish Brown (10YR 5/4) Fine to Coarse						
					Ę'Ţ	SAND, Some Silt & Clay, Some	\vdash	+				
3	22	18"	M	24	Εl	Gravel (SM)	-	╁				<u> </u>
4	SS	18"	М	^β 96'	E]							
					E"T							
					E							
5	SS	18"	M	20	F.,	Medium Dense to Very Dense, Light Yellowish Brown						
					E15-	(2.5Y 6/4) Fine to Coarse SAND, Some Silt & Clay,						
			ļ		E	Trace of Gravel (SM)						
6	SS	18"	М	28	F_							
					20-							
					E							
7	SS	18"	м	32	<u></u>			T				
					25-	Encountered More Gravel &						
					ĒΙ	Less Silt from 25' - 30'		ļ				
8	SS	16"	М	54	F			T				
~ .					E 30 -	Boring Completed to 30' on 2/15/82	()	Po	cke	: Pen	etro	neter
					E	,		Re	adi	ıg, T	SF	
					F							
					E 35-							
					E			ļ				
					F							
					E 49-	, ·						
				1	E		1	}				
					╄ _┈ ╏	 -						
					-45-			T				
						(Continued)		1				

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Boring No. PBM-82-04
Surface Elevation 869.0
Job No. C. 10313
Sheet 2 of 3

≈1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

SAN	SAMPLE			VISUAL CLASSIFICATION	SOIL PROPERTIES						
Recovery	1 .	sture		and Remarks	q ₃	w	LL	PL	ם		
No. Type	W	82	Depth	Boring Completed from 30' to 113' on 3/16/82 Unit: SAMS-2 Chief: Larry F. Very Dense, Light Yellowish Brown (2.5Y 6/4) Fine to Medium SAND, Little Silt, Trace Gravel (SP-SM)							
10 SS 48	М М	91	70- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1-	Very Dense, Yellowish Brown (10YR 5/4) Fine to Coarse SAND and GRAVEL, Little Silt (SP-SM)							



LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Boring No. PBM-82-04
Surface Elevation 869.0
Job No. C 10313
Sheet 3 of 3

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	S	AM	PL	E		VISUAL CLASSIFICATION	so	IL PE	ROP	ERT	TES
	Recovery Moisture			and Remarks	qu	w	ш	PL	0		
Na.	SS	18"	A	1000	100- -105- -115- -120- -130-	Very Dense, Yellowish Brown (10YR 5/4) Fine to Coarse SAND, Some Gravel, Little Silt (SP-SM) End Boring at 113' No Mud Loss During Drilling Operation					
			W	ΆΤ	ER	LEVEL OBSERVATIONS	GE	NER	AL	TON	ES
Upt	While Drilling Upon Completion of Drilling Time After Drilling Depth to Water 28.21				k hou		Crev Drillin	715/82 Chiellong Met 0-30'	IG/MG hod	Ria .55	5-1

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LOG OF TEST BORING

Project Badger Army Ammunition Plant Location Baraboo, Wisconsin Boring No. PBM-82-05 Surface Elevation 873.7 Job No.C..10313.....

_1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

	s	AM	PL	E		VISUAL CLASSIFICATION	sc	IL I	PR	OP	ERT	TES
	Rece	very	Mois	ture		and Remarks	Qu		\prod	u	PL	D
Ne.	Type	¥	+	N	Depth		<u> </u>				7.	
				-	<u> </u>	10" TOPSOIL Stiff, Dark Brown (10YR 3/3)	┥	 	+			<u> </u>
 	SS	18"	M	6		Silty CLAY (CL)	(1.5	}				<u> </u>
2	SS	18"	М	6	<u> </u>	*						
<u> </u>	60	7.00		<u> </u>	<u> </u>	Dense to Very Dense, Light	}	-	+			
3	SS	18"	M	38	Εl	Yellowish Brown (2.5Y 6/4) Fine to Coarse SAND, Some		_	+			
4	SS	16"	M	52	E ₁₀ _	Silt & Clay, Some Gravel (SM)						
					Ė	0 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ł					ĺ
					F	Occasional Cobbles at 7.5'						<u> </u>
5	SS	18"	M	41	E ₁₅ _			<u> </u>	_			
					Ē							
L					F		<u> </u>		_			<u> </u>
6	SS_	12"	M	52	E20-			<u> </u>	-			
			-		E		ĺ					
				_	È l				_	_		
7_	<u>ss_</u>	8"	M	62	<u>-</u> 25-	Dense to Very Dense, Light	-		+	-		
ļ					E	Yellowish Brown (2.5Y 6/4) Fine to Coarse SAND and GRAVEL,						•
				ļ	Εl	Little Silt & Clay (SP-SM)	-	-	\dashv			
-8	SS_	12"	M	45	<u> </u> 39	Boring Completed to 30' on 2/15/82	-		+			
İ					E		()	Pock Read			trom F	eter
 					E		-	-	\dashv	-		
ļ				-	- 35-	4.000.000	-	-	+			
					E	* Loose, Dark Brown (10YR 3/3) Fine to Medium SAND, Some						
				 	E	Silt & Clay, Some Gravel (SC)		<u> </u>	_	\neg		
					- 49-	\ \			1			
					E						İ	
					45-							
					3							
						(Continued)						J



LOG OF TEST BORING

Project Badger Army Ammunition Plant

Boring No. PBM-82-05 Surface Elevation 873.7

Job No. C 10313 Sheet 2 of 3 Location Baraboo, Wisconsin

_1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848 __

	SAMPLE Recovery Maisture			VISUAL CLASSIFICATION	so	L PF	ROP	ERT	IES		
	T	۱ ،	١,	sture	1044	and Remarks	Qu	w	LL	PL	D
NO.	Type	_	. 🔻	I N	Depth		+				
_					臣丨	Boring Completed from 30' to 121.5'					
				-	<u> </u>	on 3/17/82					
				\vdash	- 50-	Unit: SAMS-2 Chief: Larry F.					
					Εl	onter. Larry F.					
9		18"		7.5	£	Very Dense, Light Yellowish					
Z	33	10"	M	13	9E ₅₅ -	Medium SAND, Little Gravel,		 ,			
					El	Little Silt (SP-SM)					
					ŧ.,						
					F 60-						
					E						
					65-						
					F"						
					Εl						
					F70-						
					El						
	_ :				╞╢						
				_	F75-					-	
					E				į		
					Εl	Very Dense, Light Yellowish					
10	<u>.s</u> s.	5"	<u>M</u>	188	E80-	Brown (10YR 6/4) Fine to Coarse SAND, Little to Some					
		1			E	Gravel, Little Silt (SP-SM)					
					₽						
			· ··		85-		-				
					F						
					El	-	-	<u> </u>		\dashv	
					F-90-					+	
]-		



LOG OF TEST BORING

Project	Badger Army	Ammunition	Plant
Location	Baraboo,		

Boring No. PBM-82-05
Surface Elevation 873.7
Job No. C 10313
Sheet 3 of 3

,1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848=

	SAMPLE Recovery Moisture					VISUAL CLASSIFICATION	so	L PF	ROP	ERT	IES
	Recovery Moisture			and Remarks	Qu	w	u	PL	0		
No.	Type	+	+	N	Depth		1	"		"	
					F						
		_			Εl				İ		1
					95				1		
			.		F						
					Εl						
					E100						
		_			E	•					
					E						
					105						<u> </u>
					E						
					E 1						
					-110						
						·					
					Εl						
			•		- 115						
					E- 1		1				
	İ				E	Very Dense Light Vellowish					
					- - 120	Very Dense, Light Yellowish Brown (10YR 6/4) Fine to Medium					
11	SS	18"	A	177	_ ,	SAND, Little Gravel, Little Silt (SP-SM)					
					Εl	End Boring at 121.5'					
					125						
					F	•					
				:	E						
					130						
			W		<u> </u>	EVEL OBSERVATIONS	GE	NER	AL	TON	res
Wh	ile Dr	illing					Star	/15/8	2 _{Corr}	plete	3/17/8
Upo	Upon Completion of Drilling						Crew	Chief	WG/MG	ig	3/17/8 55-1 -10'
Depth to Water						FA	10-30			-10	
	oth to			_	29.0'	Moist	DM/	WO 30-	121.	5'	· · · · · · · · · · · · · · · · · · ·

LOG OF TEST BORING

Project	Badger Army Ammunition Plant	
	Baraboo, Wisconsin	

Boring No. PBN-82-01A Surface Elevation 881.5	
Surface Elevation881.5	٠.
Job NoC. 10313	
Sheet of 3	

_1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (606) 257-4848.

	S	AM	PL	E		VISUAL CLASSIFICATION	SOIL PRO			PERTIES				
	Rec	wery	Meis	ture		and Remarks	w LL PL		D					
Ne.	Type	-	↓	N	Depth			-						
					E	12" TOPSOIL		 	 					
1	SS	18"	<u>M</u>	8	E*	Medium to Stiff, Dark Brown	-							
2	22	18"	M	4	- 1	(10YR 3/3) Silty CLAY (CL)	(1.0)							
	33				E57									
3	SS	16"	M	8	<u> </u>		Τ		-					
	-	701	30	24	E	lanca to Donna Light Vallowish			 		 			
4	22	18"	M	24	E10-	Loose to Dense, Light Yellowish Brown (2.5Y 6/4) Fine to				 				
					E	Medium SAND, Trace to Little Silt, Little Gravel (SP-SM)								
	SS	17"	М	20	F.									
					15-	Same Convert Europeantered from				}				
				}	E	Some Gravel Encountered from 14' to 20'								
6	SS	5"	М	28	E ₂₀ -									
¥	1				E									
				İ	E									
7	SS	9"	М	43	<u> </u>									
	133	-		1	25-		()	Pocke	t Pe	etro	meter			
					E			Readi						
8	ss	6"	M	47	Εl									
9	33	8	I II	17/	E 30-	Boring Completed to 30' on 2/17/82								
			ļ		F	* 2' of Frost Present					9.			
	+	 	\vdash	+	ĘΙ				 	 	 			
	 -	 	-	+-	35-	Note: Moved over and pushed 3"		†						
					-	shelby tube hydraulically								
	+-	├-	├ -	-	ŧ	shelby tube hydraulically from 4' to 6' (50-100 PSI); Sample 2A: 20" Recovery	 	-	 	 	-			
	\parallel $-$	-	-	┼	-40-		-							
					E									
	-		├	+	£Ι		<u> </u>		-		-			
	-		-	-	45-			 	 	 	 			
					}		}							
	1					(Continued)								



LOG OF TEST BORING

Projec	t Badger Army Ammunit	ion.Plant

LocationBaraboo, Wisconsin.....

Boring No. PBN-82-01A
Surface Elevation .881.5
JOB NOC. 10313
Sheet 2 of 3

... 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

	S	AN	IPL	E		VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	TES
		ery	Moi	sture		and Remarks	q.	w	ш	PL	D
No.	Type	•	+	N	Depth						
				-	F		-		 		
											
					E						
					<u> </u>	Boring Completed from 30'-115' on 3/18/82					
			L	<u> </u>	+	Unit: SAMS-1					
				_	FI	Chief: Larry F.	ļ				
9_	SS	18"	M	14	1-55-						
	. !				F				! 		
				}	E	Very Dense, Light Yellowish Brown (2.5Y 6/4) Fine to					
				 	‡ 1	Brown (2.5Y 6/4) Fine to Medium SAND, Trace to Little					
				 	E60-	Silt (SP-SM)					
					E						
				<u> </u>	F .						
			_	<u> </u>	E ₆₅ -		j				
				}							
		<u> </u>			E					ĺ	
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				<u> </u>	E70-						
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		}									
					E	_				İ	
10		10#	<u></u>	100	<u>.</u>	Vany Dansa Vallowich Brown	1				
<u></u> 77.	-55	10_	<u> </u>	10	5-80-	Very Dense, Yellowish Brown (10YR 5/4) Fine to Coarse					
					E	SAND and GRAVEL, Little					
				 _	F	Silt, Occasional Cobbles (SP-SM)					
	ļ			<u> </u>	85-	•					
					F	Drove a Boulder at 79'				Ī	
				ŀ	E					1	
					È⊹ Ì						
			 	 	- 90-			-		- 1	
				1						ļ	
			ļ			(Continued)				1	



LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

Boring No. PBN-82-01A
Surface Elevation 881.5
Job No. C 10313
Sheet 3 of 3

-1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS, 53715 • TEL. (608) 257-4848...

	S	AM	IPL	E		VISUAL CLASSIFICATION	so	IL P	70 P	ERT	IES
	Reco	very	Mois	ture		and Remarks	Qu	144		01	
No.	Type	ţ	+	N	Depth		4"	W	LL	PL	D
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					E						
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					<u> </u>						
					105						
					F					l	
					EI		1				
						Very Dense, Yellowish Brown					
					110	(10YR 5/4) Fine to Medium SAND, Trace Silt (SP)					
					F	SAND, ITACE STIL (SP)					
1	SS	18"	<u>M</u>	101	E115		 				
					Εl	End Boring at 115'					
					F						
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					Εl						
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					125					Ī	
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					-T30		-				
			W	AT	ER I	EVEL OBSERVATIONS		NER			
	ile Dr	_					Starf	2/16/8 Chief		plete	/18/ :5-1
					rilling_ k hou	r	Crew	Chief		ig S Ω-	10'
	e Afi oth to			. –			FA	10-30	nod 4		
	oth to			_	26'Mo	ist		v 0 30-			

LOG OF TEST BORING

Project	Badger	Army	Ammunition	Plant
			sconsin	

Boring No.
Surface Elevation8815.
Job NoC. 10313
Sheet] of]

1409 EMIL STREET • P.O. BOX 9538. MADISON. WIS. 53715 • TEL. (606) 257-4848-

	S	ΑN	IPL	E		VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	TES
Ng.		very	Mei:	sture N	Depth	and Remarks	Qu	W	LL	PL	D
NQ.	Type	<u> </u>	 	-	- nehru		 		-		
					E	150 Gallons of Drilling Mud Loss between 20' - 30'			1		
					F	Loss between 20° - 30°			<u> </u>		
					E _				ļ		
				į	-	•			}		
					E	NOTE: For more detailed subsurface information,					
					E40-	refer to Log of Test					
				ļ		Boring No. PBN-82-01A					
				ł	E						
					F	·					
					E						
		•							ŀ		
				-	Ë						
			ļ		80-		-				
				 	E	300 Gallons of Drilling Mud Loss between 90' - 100'					·
					<u>-</u>	Loss between 90' - 100'					
					E	•					
					È	·					
				<u> </u>	- 12 0						
					F		1 1				
					E	End Boring at 129'	7				
					E						
					E						
					F						
			\A	/ A T	160	LEVEL OBSERVATIONS	G	NER	ΔΙ	NOT	EC
					ER	LEVEL OBSERVATIONS		3/10/8			
	iile Di on Co			of [Orillina		Star	t' v Chief	. Com	iplete Ria SA	MS-2
	ne Af				-		Drilli	ng Met	hod		
	pth to			-			DM	0129	•		
De	pth to	Ca	ve In	-					••••		

LOG OF TEST BORING

Project Badger Army Ammunition Plant	Sui
Location Baraboo, Wisconsin	Job She

Borina N	lo. PBN-82	2-01C
	Elevation .	
	C10313.	
Sheet] of .	1

,1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

SAMPLE Recovery Moisture						VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	IES
No.		very	Mois		Depth	and Remarks	Qu	w	LL	PL	D
Me.	Type	1	7	N	nebru			<u> </u>	 -		
-	Į				F		1		1		
					E						
				\vdash	E				l		
					- -	NOTE: For more detailed subsurface	├				
						information, refer to Log of Test Boring No. PBN-82-01A					
	·				- - 40-	600 Gallons of Drilling Mud Loss from 18' - 22'					
					ĔŢ						
					F		}				
					Εİ			ļ ————	 		
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				-	<u> </u>		1				
		-		-	[-	End Boring at 138.5'	 	·		}	<u> </u>
					-	End bot thy at 130.3	1				
					Εİ		1				
					<u> </u>						
					F -						
			W	/AT	ER	LEVEL OBSERVATIONS	GE	NER	AL	רסא	<u>res</u>
Wh	ile Dı	rilling	ı				Star	3/9/82 v Chief	. Com	plete	/9/82
Upon Completion of Drilling								v Chief	LF.	SA Sign SA	115-1
	e Af				-		Drilli	ng Met	hod !	DM 0-	138.5
Des	oth to	Wa	ter	-			 .			4	
Des	oth to	Ca	ve In	_			.				

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

1409 Emil Street • P.O. Box 9538, Madison, Wis. 53715 • Tel. (608) 257-4848

	S	AM	PL	E		VISUAL CLASSIFICATION	sc)IL	PF	ROP	ERT	TES
		wery	Mois			and Remarks	Q.		w	ш	PL	D
No.	Type	+	•	N	Depth	10" TOPSOIL		╀-				
1	SS	18"	M	14	Ť,	Stiff to Very Stiff, Dark Yellowish Brown (10YR 3/3)	(2.2	上				
	2".67	2411		-		Silty CLAY (CH)	<u></u>	+				
2	3"51	24"	<u> </u>	_		Shelby Tube Pushed Hydraulically	(1.2					
3	SS	18"	M	7	E.	**		L				
4	SS	18"	M	100,4	10-	Very Dense, Light Yellowish Brown (2.5Y 6/4) Fine to Coarse SAND & GRAVEL, Little Silt & Clay (SM-SW)						
5	SS	18"	M	143	- - 15-							
6	SS.	18"	M	44	- - - - - - - - - - - - - -	Dense to Very Dense, Pale Yellow (2.5Y 7/4) Fine SAND, Little Silt & Clay, Some Medium Sand (SP-SM)						
7_	SS	18"		84		No Recovery at 30'						
8	ss		М	1008"	30-	Boring Completed to 30' on 2/10/82	()	Poc	ket	Pene	trome	eter
						* 1.5' of Frost Present				g, Τ\$		
						<pre>**Loose, Dark Brown (10YR 3/3) Fine SAND, Some Silt & Clay, Little Medium Sand, Trace Coarse Sand (SC)</pre>						
					40-							
		_			-45-			-				
						(Continued)						J

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LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

Boring No. PBN-82-02A
Surface Elevation 882.9
Job No. C 10313
Sheet 2 of 3

.1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4648 🚤

No. Type	18"	•	N 48	Depth	Bor on Den	ing Com 5/1/82 Unit: Chief: Se, Ver YR 7/3) D, Trac t (SP)	SAMS- Tom 0	from 2 . Brown	30' - 1		q.		N	u	PL	
				555-	on Den	ing Com 5/1/82 Unit: Chief:	SAMS- Tom 0	from 2 . Brown	30' - i	116'						
9 SS	78"	M	48	- - - - - - - - - -	on Den	5/1/82 Unit: Chief: se, Ver	SAMS- Tom O	2 Brown	i um	116'						
9 SS	18"	М	48	- - - - - - - - - -	on Den	5/1/82 Unit: Chief: se, Ver	SAMS- Tom O	2 Brown	i um							
9 SS	18"	M	48	- - - - - - - - - -	(10	Chief:	Tom 0 y Pale	Brown	า์ เเก							
9 SS	18"	M	48		(10	YP 7/31	Fine .	tn Mad	า์ เเก							
9 SS	18"	M	48		(10	YP 7/31	Fine .	tn Mad	า์ เเก							
9 SS	18"	M	48		(10	YP 7/31	Fine .	tn Mad	า์ เเก							
				البلدادار	SAN Sil	D, Trac t (SP)	e Grav	el, Tr	ace							
				البلدادار												
				البلدادار												-
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io ss	24"	M	91	E-80-	Coa	wn (10Y) rse SANI t (SP)	R 6/4) D, Some	e Grav	co el, Tra	ace	[
					Sil	t (SP)						}				
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LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

_1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

SAMPLE	VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	IES
Recovery Moisture	and Remarks	T				
No. Type 🔻 🕴 N Depth		qu	W	IL	PL	D
110 SS 18" M 62 120 125 130.	Very Dense, Pale Brown (10YR 6/3) Fine to Medium SAND, Trace Silt (SP) End Boring at 116' No Mud Loss Encountered During the Drilling Operation					
WATER L	EVEL OBSERVATIONS	GE	NER	AL I	VOT	ES
While Drilling	·	Start	2/10/8	€om	plet 5/	17/82
Upon Completion of Drilling		- C	. Chinel	ے 5.	, 55	-2
Time After Drilling ½ hour	·		g Met	hód . Ni	- 0 CJ	10.
Depth to Water Depth to Cave in 26 M			/WO 3			

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LOG OF TEST BORING

	Bound IN
Project Badger Army Ammunition Plant	Surface (
	Job No
Location Baraboo, Wisconsin	Sheet

Boring N	ю. PBN-82 -	.02B
Surface	Elevation .	882.9
Job No.	Elevation . C 10313	\
Sheet	•	1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

	s	AN	1PL	E		VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	IES
	Reco	very	Mois	ture		and Remarks	Qu	w	u	PL	
No.	Type	→	+	N	Depth		ļ ,				
			}		<u> </u>		1	ļ			- 1
					E	,					
			_		-			ļ			
					F	NOTE: For more detailed					
					Εl	subsurface information,]				
					FI	refer to Log of Test Boring No. PBN-82-02A					
					F-40-	-	 				
					-						
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					E 1	No Water Loss - Used 7 Bags of Well Gell			· -		
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					F	End Boring at 129.5'				j	
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					E]	<u> </u>			
					E						
	1		W	/AT	ER	LEVEL OBSERVATIONS	GE	NER	AL	רסת	ES
9.4.0-		_:107 — -						t3/8/8			
	ile Di on Ci	_	_	of E	Orilling	<u> </u>	Crev	v Chief	LF F	Rig SAI	4S-1
•		-	Orillin				Drill	ing Met	hod D	M 0-	29.5
	pth to			•					•••••		
De	pth to	o Ca	ve In	_					********		

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Surface Elevation .882.9.... Job No. C 10313

Location Baraboo, Wisconsin

Sheet ... l.... ofl.

Boring No. PBN-82-020

	S	AM	PL	E		VISUAL CLASSIFICATION	so	IL P	ROP	ERT	IES
	Reco	very	Mois			and Remarks	qu	w	LL	PL	0
Ne.	Type	*	+	N	Depth		-		-		
					E 1						
					Εl				 `		
					E -						
						NOTE: For more detailed subsurface information, refer to Log of Test					
					E I	Boring No. PBN-82-02A			 		
		_			E40-				-		
			!		<u> </u>						
					Εl				-		
	}	[╞╶┨	110 Gallone of Drilling Mud			-		
						110 Gallons of Drilling Mud Loss from 40' - 60'					
					E						
					E-80-				 -	<u> </u>	
					E						
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					<u> </u>				<u> </u>		
					E	End Boring at 139'					
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	<u>.</u>		W	'AT	ER	LEVEL OBSERVATIONS		NER			
Whi	ile Dr	illina					Star	3/9/82 t	. Com	3/ aplete	9/82
Upo	on Co	mpk	tion	of C	orilling.	<u> </u>	Crev	v Chief	LF f	ءنہ 5	iams-1
				9 <u></u> .			Drilli	ng Mei	thod	DM O-	133
	oth to oth to			-							•••••

LOG OF TEST BORING

Project Badger Army Ammunition Plant Sur

Location Baraboo, Wisconsin She

Boring No. PBN-82-03A
Surface Elevation 857.6
Job No. C 10313
Sheet 1 of 3

_1409 EMIL STREET • P.O. BOX 9638, MADISON, WIS. 53715 • TEL. (608) 257-4648...

SAMPLE					VISUAL CLASSIFICATION						
	Rece	every Meisture and Remarks						w	L	PL	0
No.	Type	+	+	N	Depth	120 700501	•		<u> </u>	'`	
1	ss	М	18"	26	-	12" TOPSOIL Stiff to Very Stiff, Dark Brown (10YR 3/3) Silty			-		
2	SS	М	18"	6	- 3-	CLAY (CH)	(2.0				
3	3"ST	М	7"	•							
4	SS	М	12"	10	10-	Loose to Dense, Light Olive Brown (2.5Y 5/4) Fine to Coarse SAND, Trace of Silt & Clay, Little to Some Fine to					
5	SS	M	18"	20	ابليا	Coarse Gravel (SP.)			<u> </u>	-	
-	33	<i>m</i>	10	30	- 15 - - 1	Color Change at 15' to Light Yellowish Brown (2.5Y 6/4)					
6	SS	М	6"	22	- - - - -						
7	SS	М	12"	41	- - - - - - - - - - - - - - - - - - -						
8	SS_	M	12"	41	Boring Completed to 30' on 2/11/82					
					- - - - - -	* 2' of Frost Present	()	Pocke Readi			meter
					11111111111111111111111111111111111111	**Shelby Tube Pushed Hydraulically from 5.5' - 7.5' at 1000 PSI					
					- - - - -	-			 		
						(Continued)]

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

Boring No. PBN-62-03A
Surface Elevation .857.6
Job No. C. 10313
Sheet 2 of 3

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION				ERT	IES
		very	Mei	sture		and Remarks	Qu	w	LL	PL	D
No.	Type	+	*	N	Depth				 		
					丰	Boring Completed from 30'-95' on 3/15/82					
				ļ.	E 1					<u></u>	
				├-	<u>-</u> 50-	Unit: SAMS 2 Chief: Larry F.			-		
				1	生	•					
_					<u> </u>						
9	SS	18"	<u>M</u>	180)E ₅₅ -	Very Dense, Light Yellowish Brown (2.5Y 6/4) Fine to Coarse SAND and GRAVEL, Little Silt, Occasional Cobbles (SP-SM)					
				1	+						
					E 60-						
					F						
				+-	E						
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10	_ss	18"	M	168	E80-	Very Dense, Light Yellowish					
					E	Brown (2.5Y 6/4) Fine to Coarse SAND, Some Gravel, Little Silt (SP-SM)					
	ļ			-	<u> </u>	Little Silt (SP-SM)					
				-	E85-						
					E						
					<u>-</u>						
					90-		 	<u>.</u>			-
						(Continued)				1	

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Banaboo, Wisconsin

Boring No. PBN-82-03A
Surface Elevation 857.6
Job No. C 10313
Sheet 3 of 3

…1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848 ←

SAMPLE						VISUAL CLASSIFICATION	1 1 1		ROP	ERT	TES
M -		very	Moi	sture	Do-Ah	and Remarks	Qu.	w	LL	PL	D
No.	Type	•	*	N	Depth	Very Dense, Pale Brown (10YR 6/3) Fine to Medium SAND, Little	<u> </u>				
11	SS	12"	W	75	E 95-	Silt (SP-SM)					
					E	End Boring at 95'					
					Ē						
			,		‡					-	
					-[100						
					E						
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	ile Dr						Star	t2/11/	82.om	plet	/15/8
	on Co ne Af				Drilling दे ho।		Crev	w Chief	hod	tig CS 0	-10'
	oth to						FA	ing Met 10-30	 	· · · · · · · · · · · · · · · · · · ·	
Dei	oth to	Cav	/e ir	ı	23.0	<u>Moist</u>	UM/	MO 30-	95 °		



WARZYN | LOG OF TEST BORING |

Project .	Badger Arm	y Ammunition Plant
Location	Raraboo	, Wisconsin

Boring No. PBN-82-03B
Surface Elevation 857.6
Job No. C 10313
Sheet of

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

	S	AM	PL	E		VISUAL CLASSIFICATION	sc	IL P	ROP	ERT	IES
	Reco	very				and Remarks	Qu	w	u	PL	D
Ne.	Type	ļ	+	N	Depth		<u> </u>	- T	111	rı.	U
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		•			F	NOTE: For more detailed subsurface					
						information, refer to		ļ			
					[-30-	Log of Test Boring No. PBN-82-3A	-				
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	İ	ľ	1			End Boring at 106'	1				
	<u> </u>				Ξl	cha botting at 100]				
					120						
			W	AT		LEVEL OBSERVATIONS	GF	NER	ΔΙΙ	יסע	.E.C
3.6.5	·	: a: -					1				
	ile Dri on Co	_					Star	3/15/8 v Chief	t Com	plete/ S/	WS-1
					_			ing Met			
	th to			-				•••••		•••••	•••••
Der	th to	Cav	e in	-				••••••	•••••	••••••)

LOG OF TEST BORING

Project Badger Army Ammunition Plant	Surface Elevation .8576.
	Job No. C 10313
ocationBaraboo, Wisconsin	Sheet of

. 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

_	s	AM	IPL	E		VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	TES
	Reco	very	Mois	ture		and Remarks					
No.	Type	1	1	N	Depth	and Remarks	Q#	W	LL	PL	D
			 		E						
		!			E			1			
			 	<u> </u>	-		 		<u> </u>		
					Εļ						
]	[
	}				E	NOTE: For more detailed subsurface information, refer to	j				
			-	-	F	Log of Test Boring No. PBN-82-03A					
			 	-	30-	No. PBN-82-03A	 				
					E						
					F						
					E						
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				{	F	No Mud Loss During Drilling Operation					
			_	-	E	no had coss but my billing operation					
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			ļ	 	E !						
			<u> </u>	 	Fi 20-	End Boring at 118'					
	·		W	/AT	<u> </u>	LEVEL OBSERVATIONS	GE	NER	AL	NOT	TES
\A/\-	ila D										/.13/.82
	ile Di on Ca		-	of [Orilling		Crev	v Chief	LF F	Ria S	AMS-1
	ne Af							ng Met			
	pth to						ľ				
De	pth to	o Ca	ve In	_			l				

LOG OF TEST BORING

Project	Badger Army Ammunition Plan	it
	Baraboo, Wisconsin	

Boring No. PBN-82-04A								
Surface Elevation .87.3.0								
Job NoC1.03.13								
Sheet 1 of 3								

,1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

	S	AM	PL	E		VISUAL CLASSIFICATION	SO	L PF	ROP	ERT	IES
	Rec	very	Meis	ture		and Remarks	g.	w	ш	PL	D
No.	Type	¥	+	N	Depth		+				
1	SS	18"	М	46	Ē,						
	SS	12"	М	8	ΕÏ						
3		18"	М	9	F 3 7	Loose to Very Dense, Yellowish Brown (10YR 5/6) Fine to					
					Εl	Medium SAND, Some Silt & Clay, Trace to Little Gravel,					
4	SS	18"	M	14	<u>-</u> 10-	Occasional Cobbles (SM)			-		
	_				Ē						
5	SS	17"	М	30	15-	Some Gravel Encountered at 14'			-		
6	SS	18"	М	44	E ₂₀ _						
7	SS	12"	M	60	<u></u>						
					25 -	Dense, Pale Yellow (2.5Y 7/4) Fine to Coarse SAND, Little					
		-	-	-		Silt, Little to Some Gravel, Occasional Cobbles (SP-SM)					
8	S <u>S</u>	5"	M	42	- 30-	Boring Completed to 30' on 2/16/82					
					E.			_			
	 	-		-	<u></u>	* 2.5' of Frost Present					
			 			Note:					
	_				E 40 -	Boring performed 20' north of proposed location due to presence of mud and snow.					
						presence of mud and show.					
				<u> </u>	- - 45-	·					
		}	1			(Continued)			}	1] _

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LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

Boring No. PBN-82-04A
Surface Elevation 873.0
Job No. C. 10313
Sheet 2 of 3

- 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

SAMPLE Recovery Maisture					1	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
					<u> </u>			T				
No.	Type	↓	1	N	Depth		đи	W	LL	PL	D	
						Boring Completed from 30'-106' on 3/12/82						
					50-	Unit: SAMS-2 Chief: Larry F.						
	66	10"		246								
. 4.	33-	. 18	[7]	241	55- - - - -	Very Dense, Pale Yellow (2.5Y 7/4) Fine to Medium SAND, Trace Silt, Little to Some Gravel (SP)						
	-				60							
					65-							
					70-							
·					75 -	·						
											· 	
19.	_ SS	18"	М.	280	80-	Yery Dense, Light Yellowish Brown (10YR 6/4) Fine to Coarse SAND and GRAVEL, Little Silt (SP-SM)					<u>.</u>	
					85- -						•	
					- - 90-							

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LOG OF TEST BORING

F	Project Badger Army Ammunition Plant
	_ocationBaraboo., Wisconsin

Boring N	o PBN-82-	04A
	Elevation	
Job No	C1031	3
Sheet	3 of	3

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	S	AM	PĻ	E		VISUAL CLASSIFICATION	so	IL P	ROP	SOIL PROPERTIES									
	Reco	very	Mois			and Remarks	Qu	w	LL	PL	D								
No.	Type	+	· ·	N	Depth -		_	"	-										
					95-	Very Dense, Light Yellowish Brown (10YR 6/4) Fine to Medium SAND, Little Gravel, Little Silt (SP-SM)													
11	SS	18"	W	285	105	End Boring at 106'													
					110-	NOTE: Recorded blow counts for Sample #9, #10 & #11 may be inaccurate. Hammer failed to fall freely for the specified 30" drop.													
					-120 -125														
				Α.Τ	130	EVEL ORSEDVATIONS	-	NER	Λ.I.	NO.7	TES.								
Up: Tim Des	ile Dr on Co ne Aft oth to	mple ter D Wat	etion rilling	of C	rilling. k-hou	r	Star Crev Drilli FA	-2/16/8 Chilly ing Met 10-30'	Com G/MG,	plet å	/12/82								

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WARZYN | LOG OF TEST BORING

Project	Badger Army Ammunition Plant
Location	Baraboo, Wisconsin

Boring No. PBN-82-04B
Surface Elevation
Job NoC. 10313.
Sheetl of 1

.1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

	S	AN	IPL	E		VISUAL CLASSIFICATION	sc	OIL PE	ROP	ERT	TIES
No.	Recovery Moisture Type V N Depth				Banth	and Remarks	qu	w	ш	PL	0
					30	NOTE: For more detailed subsurface information, refer to Log of Test Boring No. PBN-82-04A					
					60-						
					90-	Drilling from 90' - 118' performed on 3/13/82					
<u> </u>		_}			120	End Boring at 118'					
WATER LEVEL OBSERVATIONS White Drilling									Complete R	pletë Ig SAI M 0-1	/13/82 1S-1

LOG OF TEST BORING

Project	Badger Army Ammunition Plant	S
	***************************************	Jo
Location	Baraboo, Wisconsin	اج

Boring No. PBN-82-04C
Boring No. PBN-82-04C Surface Elevation 873.0
Job NoC. 10313
Sheet 1 of 1

. 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848=

SAMPLE						VISUAL CLASSIFICATION		SOIL PROPERTIES							
Recovery Moisture				,	and Remarks	Qu	W	LL	PL	0					
No.	Type	+	+	N	Depth		 								
					E			1	l						
					E	·	 		Ŀ	İ	<u> </u>				
					F	NOTE: For more detailed									
					E	subsurface information,									
					E	refer to Log of Test Boring PBN-82-04A									
					E40-				<u> </u>						
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				-	Ę	·			 						
				-	120-	·									
					F					·					
					F	End Boring at 129'									
				 	Ę 4										
]				}	F	_									
					Εļ	· .									
					E										
		<u>·</u>	W	/AT	ER	LEVEL OBSERVATIONS	GE	NER	AL	TON	TES				
W/L:	ile Dr							3/11/8							
							Crev	v Chief	LF F	Rig SA	MS-1				
Time After Drilling								w Chief	thod [O-MC	129'				
	oth to			-					•••••	·····					
Der	oth to	Cav	/e In	-			1								

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

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	S	AM	PL	E		so	IL F	ROF	ERI	TIES	
Recovery Moisture			VISUAL CLASSIFICATION and Remarks								
No.	Type	+	ţ	N	Depth		-	W	ш	PL	0
1	SS	12"	М	7	E *	Black (5Y 2.5/1) Clayey SILT (ML)	(4.5+)			
2	SS	18"	М	11	5-	Medium to Very Stiff, Dark Brown (10YR 3/3) Silty	(3.5)				
3		18"	М	7		CLAY (CL)	(2.5)				
4	SS	18"	M	9	E 10-	Little Sand at 10'	(0.8)				
5_	SS	18"	М	2	- - - 15- - - - -	Very Loose to Medium Dense, Dark Yellowish Brown (10YR 3/4) Fine SAND, Some Silt & Clay, Little Gravel (SM)					
6	SS	12"	М	18	20	Boring Completed to 20' on 2/15/82					
7	SS	14"	М	33	25-	Dense, Light Yellowish Brown (2.5Y 6/4) Fine to Medium SAND, Little Silt & Clay, Some Gravel (SP-SM)					
8	<u>\$\$</u>	14"	M	37	30-	Boring Completed to 30' on 2/16/82					
		-			35-	* 2.5' of Frost Present		1			
					40-	Note: Moved over and pushed 3" ST hydraulically from 6' to 8' (100 PSI)	()				meter
		_			45-	Sample 3A: 14" Recovery		Read	ing,	SF	
			'			(Continued)					

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LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Surface Elevation 875.8

Job No. C 10313

Sheet 2 of 3

...1409 EMIL STREET • P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (606) 257-4848.

	S	SAMPLE VISUAL CLASSIFICATION					SOIL PROPERTIES							
Recovery Moisture				ture		and Remarks	Qu	w	IL.	PL	0			
No. Type			+	N	Depth		ļ. <u>.</u>	"	-					
_						Boring Completed from 30'-110' on 3/13/82								
	1	_			Εl									
					[50-	Unit: SAMS-2 Chief: Larry F.								
					Εl									
9	SS	14"	M	96	- -55- -	Very Dense, Light Yellowish Brown (2.5Y 6/4) Fine to Medium SAND, Some Gravel, Little Silt & Clay (SP-SM)								
					60-									
					E,]									
					-65- - -									
														
					E 70-				-					
					E									
					- - 75 -	·								
					Ė,									
10	SS	12"	м	45		Dense, Light Yellowish Brown								
· <u>·</u>				- 73	E 80-	(10YR 6/4) Fine to Coarse SAND and GRAVEL, Little Silt, Occasional Cobbles (SP-SM)								
				_		uccasional cobbles (SP-SM)								
	.				E-85-	·	-							
					E E									
					 90-									
						(Continued)				. !				

LOG OF TEST BORING

Project Badger Army Ammunition Plant	
Location Baraboo, Wisconsin	

Boring No. PBN-82-	-05A
Surface Elevation	875.8
Surface Elevation Job No. C 10313	} . • • • • • • • • • • • • • • • • • • •
Sheet3 of	

≈1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848 =

Recovery No. Type	Moisture N	95-	VISUAL CLASSIFICATION and Remarks	qe	W	LL	PL	D
No. Type	 	95-		4	•	, LL	PL	U
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			•					
		100						
		100						
		F100		1 '				·
1 1 1				-				
1 1 1		F		1				
		FI						
		105	V					
		E	Very Dense, Light Yellowish Brown (10YR 6/4) Fine to Medium SAND.					
		FI	(10YR 6/4) Fine to Medium SAND, Some Gravel, Little S.				1	
_		士	and Clay (SP-SM)	}	<u>_</u>	!		
11 55 9"	M 7	1 [110		+				
		E	End Boring at 110'				ļ	
_		<u></u>						
		-F115						
		FI		1 1				
		EI		1 1	1			
		F.,,	•					
		120						
		FI						
		丰 1						
		125		 		<u> </u>		
		E						
		<u></u>						
	-	F130		-				
	WA	TER L	EVEL OBSERVATIONS	GEN	VER/	AL T	VOT	ES
While Drilling.				Start/	15/82	Com	3/1	3/82
Jpon Comple	tion of			Crew	Chie#	G/MG	io .55	-1
Time After D	_	1 hour		Drilling	g Metr	nod .	CS 0-	10'
Depth to Wat Depth to Cav		30.01	loist		0-30' 10 30			

LOG OF TEST BORING

Boring No. PBN-82-058
Surface Elevation 875.8 Project Badger Army Ammunition Plant Job No. ... C. 10313 Sheet ... 1 of ... 1 Location Baraboo, Wisconsin

	S	AM	PL	E		VISUAL CLASSIFICATION	SO	IL P	ROP	ERT	TES
	Reco	чегу	Mois	ture		and Remarks	Qu	144	Ι	D.	
No.	Type	+	¥	N	Depth		4.	W	II	PL	D
						NOTE: For more detailed subsurface information, refer to Log of Test Boring No. PBN-82-05A					
					الماليالياليال	Drilling from 15' - 122' performed on 3/11/82					
					-80-						
					120	No Mud Loss During Drilling Operation					
						End Boring at 122'		. —			
			W	AT	ER	LEVEL OBSERVATIONS	GE	NER	AL	רסע	ES
Jp: Tirr	e Afi	mple	etion	of C	Orilling,		Stari	/10/8 Chief	² Corr	npletë Rig SAI	/11/ MS-1

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LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Boring No	PBN-82	2-05C
Surface E	levation .	875.8
Job No	C 10313	·····
Sheet		

. 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

	S	AM	IPL	E ·		VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	IES
	Recovery Moisture					and Remarks	q.	w	ıı	PL	0
0.	Type	+	+	N	Depth						
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	ļ			· ·	E	NOTE: For more detailed subsurface information,]				
- 1	Ì		•	}	F 1	refer to Log of Test	Ì				
					Ean	Boring No. PBN-82-05A					
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4					-8 0-		 				
					E	400 Gallons of Drilling Mud Loss at 90'	l	Ì			
ļ	1	į			E	F022 9F An]			
		-			FI			1			
一					E 1	Drilling from 75' - 131' performed on 3/11/82				-	\
Ì				ŀ	₽ I	011 3/ 11/ 02		}			
_					FI		l				
					E120	•					
Ì		!			F		1	}			
1				}	F		}				
-					Εl	End Boring at 131'					
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					E	,	ł) .			
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					FI						
			1		<u> </u>	EVEL OPCEDVATIONS	65	NED	A !	NOT	
WATER LEVEL OBSERVATIONS								NER			
							Star	3/10/8 • Chief ing Met	L F	plete	11/82
-					Drilling.		Cre	w Chief	F	Rig SA M O-	MO-4 \ 131'
			Drillin	9 .			Orill	ing Met	thod '		
	oth to		iter ve In	-						******	••••••

FIELD BORING	LOG			BORING	NO. LOE	3-90-0	/
T NO.: 6298-11	PROJECT NAME:	USATHAHA- BA	ap FS		PAGE	/ GF	2
DATILING CONTRACTOR: LAY	NE SOUTHWEST	DRILLER: G	Rodricaez	DATE STARTED &	/21	COMPLETED	8/21
HETHOD: DUAL WALL	CASING SIZE: 9 IN.		TIP W: TEA	2_ PROTECT	TON LEVEL:	D	1
GROUNG ELEV.:	SOIL DRILLED: /4	/, 5" WATE	R LEVEL: = 140	TOTAL O	EPTH: /4/	1.5'	
LOGGED BY: TRUSS	CHECKED BY	r: P. Bola-	DATE:	9/28/90			

SAMPLE	DEPTH IN	BLOWS PER	PEN.		COMMENTS ON	1KDM	CRING
. WQ.	PEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF SCRING	TIP	LEL
S#/	0-1.5	147	18"	dark brown med-In SAND with sitt grave, black viturious slag	<i>5:11</i>	0,0	,
S#2	5-6.5	524	18"/	black vitreous stag waste rail. (possible asphatt)	metals + ABN Sumple	D.C	
	6.5-7.5	442	18"/	back asphalt with wood sandy texture	5,11	0.0	:
	10-125		18:	dark brown to black oily asphaltwaste wit wood.		3.9	
1544	15-16.5	P	1	15-15.5 dark brown to black as phat was at Acree	change at 15.	00	
	20- 2/.5			15.5-165. brownto fru In-med Sand wit little graves. tan En-med SAND wit little graves + highly weathered gebbro boulder 59	glacial till	<i>0</i> 0	
5#6	25-26.5	61011	18	Tan In-med SAND wt/ true gravel SP		0.0	
7	46-475	7,215	18"	Tan In-med SAND wt/ true gravel SP Tan Med-In SAND wt true gravel SP		0.0	

FIELD	BORING	LOG			BORING NO	0. 608-9	(O-	0/
PROJECT NO	.: 6296-11	PROJECT	NAME:	usathana- Baap FS		PAGE 2_ 0	2	
ORILLING C	ONTRACTOR: LAY	NE SOUTHWES	r	DRILLER: C. Redrique	THE STARTED T	Li/ac COMPLE	TED	
METHOD: DU	IAL WALL	CASING SIZE: 9	M.	TIP W: TE+2	PROTECTION	rever: D		
CROUNC ELE	٧.:	SOIL DRILLED:	KI	1.5 WATER LEVEL: = 140	TOTAL DEPT	1: /41,5°		
LOGGED SY:	Buss	CHEC	XED 81	r: P Bolar DATE: 91	28/90			
SUPLE	DEPTH IN	BLOWS PER	PEN	. DESCRIPTION		COMMENTS ON ADVANCE OF BORING	MONIT	CRING
MG.	FEET	6-INCHES	REC				TIP	LEL
			1 - 4	11 - 6 00.00	1 - 1/	/ //		

SMPLE	DEPTH IN	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON AGVANCE OF BORING	MONT	TCRING
110.		G-INCHES	REC.			TIP	LEL
58	67-68.5	620	14"	tan Crise-Fine SAND with gravel 59	Sturial depost	0.0	
5*1	86-875	2535	18"	tun med- In SAND out occasion gravel byer 69/59	d		
 	87-116		~	med - In SAND wt/gravel. possible silt zone Gilt encrusted			
	122-124		-	V dense grave/cobble zone			
	128		-	tan cuttings, less sitt, cleaner			
S#10	140-14/5	14 ₃ 7 35	18"	coarse grave prevents results in loss of material from split spoon. 3rd attempt yields erse sand			
1				from split spoon. 3 attempt yields erse sand by gravel.			
	-						
!							

FIELD	BORING	LOG		andreasan ann an Aireann an Aireann an Aireann an Aireann an Aireann an Aireann an Aireann an Aireann an Airea Ta	BORING	NO. LOB-9	'O-0'	20
CT MO	.: 6298-11	PROJECT	NAME:	USATHAMA- BAAP FS		4	OF /	
ORILLING C	ENTRACTOR: LAY	NE SOUTHWES	r	ORILLER: G. Rodviguez DI	ATE STARTED 8	/2/ COMPLE	TED 5/	21/50
HETHOD: DI	JAL WALL	CASING SIZE: 9	IN.	TIP N: TE#2	PROTECT	ION LEVEL: D	, , , , , , , , , , , , , , , , , , ,	7
CROWN ELE	V.:	SOIL DRILLED:	2/	, 5' WATER LEVEL: NA	TOTAL DE	PTH: 21.5'		
LOGGED BY:	JB,	CHEC	XED BY	: Part BL DATE: 8/	21			
		· 3"	0D	55 Sampler. Lo 9/25/	60			
SAMPLE NO.	DEPTH IN	BLOWS PER 6-INCHES	PEN.	DESCRIPTION		COMMENTS ON ADVANCE OF BORING	MONE	CRING
,			REC.	·			TIP	LEL
	0-1.5	1	18//	6" davk brown sitts with roots red mater 12" brown to tan sitty	rial Asphat Sine SAND	FILL	0.0	
S#2	5-6.5	12 13 15	13"/	tan In SAND wt M.	ed Gravel	٠	0.0	
S#3	10-11.5	9 11 14		Tan 5n SAND with Sine. Med Gravel	th little		0.0	
5#4	15-16.5	91212		similar to S#3.	કર		0,0	
S# 5	20-21.5	101011		Similar to S#1	× 59			
				2051 BOE (move 755) to center of Landfill.	f 5W f 011			
				·				

FIELD	BORING	LOG	Boring No
Project No 06 853-03 Project	Name BABGE	R AAP	Page 1 of 2
Contractor LAYNE	Driller & Row	NGWZ Date star	ted 10-16-91 completed 10-10-21
Method Dugit WALL Casing !	128 9" O.S.	HNU 11.7/10.2	Protection Level 12
Ground EL Soil Dri	led /5/'	4 below ground	142 Total Depth /5/
Logged by RRR Chec	ted by DRP	Date 0/11	191

Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	MA	_	LEL
5-1	0-10'			LT BROWN SAND, PGD.	0	JAR		
<i>3</i> (0-70			F, TR COBBLES, TR		o	0	0
				C GRAVEL, TR SILF				
5-2	10 - 20'			SAME AS S-1	(SP)	0	0	0
s-3	20'-30'			B4 64 64	50	0	٥	O
s-4	30 -40'			LT BROWN SAND, PLD.		0	0	٥
	-			• *	(SP)			
				C GRAVEL , TR COBBLES.				
				TRE SILT				
s-5	40 - 50			SAME AS 5-4	50	,	0	•
s - 6	50.60			40 40	SP	o	ø	0
S-7	60-70			LT BROWN SAND, WED				
3 - ¥				M-C. SOME FINE GRAVEL, TR COBBLES. TR F SAND	<u></u>	0	0	0
S-8	70-80			SAME AS 5.7	(SW)	С	٥	a
s - 9	80-90			80-84' : Same A; 5-7	<u></u>	U	σ	٥
•				84-90: LT BROWN SAND.	SP			
				COARSE SAND , TR FINE		1		
				SAND . TR FUE GRAVEL				
5-10	90-100			SAME A: 5-9 (84-961)	SB	0	0	0
S-11	100-160			SAME AS S-10	30	0	0	c
S-12	110-120			110 -172 SAME 5-10	SP		o	
				112-120 : COABLE AND		Ĭ		G
				Bord Le ZONE, SOME				
				L SAND, TR MEDIUM SA		1		
				- The mooning SA	ro	1		
								`

FIELD BORING I	LOG	Boring No. Lom - 91-
Project No 06853 03 Project Name BADLER	AAP.	Page 2 of 2
Contractor LAYNE Driller 6 788	A LOUZ Date Started	0.10-4/completed 10-10-91
Method WAL WALL Casing Size 9" O.D. H	INU 11.7/10.2	Protection Level D
Ground El Soil Dritled 1511	4 below ground 142	fotal Depth /5/
Logged by RRR Checked by DRP	Date 10/11/91	

Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring		onite	LEL
5-/3	/20-/30			120 -123 : SAME AS 5-12		-	AIR	
				WGD, F-C, SOME CSWO				
				COBBLES		! 		
S-14	130-140			LITTLE MED, TR F GRAVEL		0	0	6
5-15	140-150			LT BROWN SANDY GATEL F-C, WOD, SOME C SAND LITTLE MED. SAND, TR COBBLES	WATER TABLE AT 142'	0	0	a
				B.O.E. = 151'				
,								
					·			
				•				
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			•					
•								

FIELD	BORING	LOG	Boring No. Lon-91-
Project No.06853-03 Project N	iame Badeva	AAP	Page of _Z_
Contractor LAYNE	Driller G R	Date started	10-25-91 completed 10-25-91
Method DUAL WALL Casing Si			Protection Level D
Ground EL Soil Drille	0 148'	4 below ground/38'	Total Depth /48'
Logged by TOTAL Check	ed by DRP	Date 10/28/91	

Sample	Depth in	Blows per	Pen	Description	Comments on	Monitorno		
_No	Feet	6 inches	Rec	OEDE INION	Advance of Boring	HN		LEL
5-1	0-10'	8-10 0-8		BROWN CLAYEY SILT, TR F SAND. PUD LT BROWN SILTY SAND, PCD.		JAR	AIR	0
5-2	10-20'			LT BRUN SOND, 76D, F, LIM M, LITTLE SILT			0	0
5-3	20-30'			LT BROWN SAND, WLD, M. SOME F. CITTLE C. TR SILT, TR F GRAVEL TREABBLES	Sw		Ø	0
5-4	30-40			SAME AS S-3	(Sw)		0	٥
5-5	40-50			LITTLE C, LITTLE F., TR F GROULL.	SP		٥	0
s-4	50-60			LT BROWN SOND, WEB, C, SOME F GRAVEL, SOME MG LITTLE C GRAVEL, TR. F SAN	· · · · · · · · · · · · · · · · · · ·		O	6
				AN CORRIER		+	6	9
5-7	60-70		!	SAME AS S-G	(Sa)			9
5-8	70-80			SAME AS 5-6	(3)		•	a
5-9	80-90			" "	(S)		0	0
5-10	90-100			LT BROWN SAND, WUS, M, SOME C. LITTLE K, LITTLE TO TR F GRAVEL, TR COBSILE TR SILT.	(3) 3		0	0
5-11	100-110			CRET. BROWN SANDY GRAVEL AND GRAVELY SAND, WED C SAND, FORAVEL. -COBBLE AND BONDER ZONE	(3)(3)		•	
NO	110-120 SAMPLE			COBBLE + Borlows			o	0
5-13	/20-/30	/28-		BROWN GRAVELY SAND, WED M-C, GRAVEL: F-C LT BROWN SAND, PLD, M. SOME C. LITTLE F	(W)		0	•

FIELD	BORING	LOG		Boring	No. B	Lom-91				
Project No 06853-65 Project Name [BADVER DAP Page 2 of 2										
Contractor LAYNE	Orner CRo	واسلاع 0	ate started	0-25-91 comple	160 10-2	5-91				
Mesnod Bur Wall Casing	Size 9"0.0	HNU 11.7/	10.2	Protection Level	Р					
Ground EL Soil D	rilled M8'	₹ pelow	ground/35.5	Total Depth /48'	,					
Logged by FULL CI	ecked by DRP	Date	10/28/91							

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Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring		onite	LEL
5-/4	130-140	/30-4	73	BROWN SONDY GRAVEL, WED, F-C, LITTLE GBBLES;	(3)	TAR	_	
S-15	140-148			SAND: C, SOME M, WET BROWN GRAVEL, WGD, F.A, LITTLE FEAND, TR SILT B.O. E = 148				5

BORING NO. LOM-8901 FIELD BORING LOG PROJECT NO .: 5753- 00 PROJECT NAME: USATHAMA- BAAP PAGE . CRILLING CONTRACTOR: LAYNE-NORTHWEST . ORILLER: 6, RODRIGUEZ DATE STARTED 2/16 COMPLETED 2/17/8 METHOD: DUAL WALL CASING SIZE: TIP eV: PROTECTION LEVEL: D 0.00 SOIL ORILLED: 158.5 GROUND ELEV .: 915.9 WATER LEVEL: TOTAL DEPTH: CHECKED BY: DATE: 2 74/ LOGGED BY: D. BELAN BUCUS PER COMMENTS ON SAMPLE DEPTH IN MONITORING DESCRIPTION ADVANCE OF SCRING 6-INCHES REC. 411 I LEL MEDBRN, SM, MOIST, LOSE 0.-101 SU PORLY SORTED , WELL ROUNDED 10 -20 MAD BON, SINGLOST, LOSSE 20 -30 OCASIONAL FINE GRAVEL MED GRN, SE, MOIST, LOSSE, TRACE . FINE - MEDIUM GRAVE MED BRN, SM, MOIST, LOOSE, SOME COBBIES AND GRAVEL MED BRIU, SM : MOIST, LOOSE, TR CRANG 50-60 had BON, SM - GP MOUST, LOUSE Go -701. ABUNDANT WELL ROUNDED; POORLY SORTED CRAPE 70 -80% MED BRN Shi wast, CLESE. MBUNDANZ WELL ROWNDED GRAVEL 5-9 90-901 MED BRN SM MOLST, LOSE, TRACE TO MODERATE WELL ROWN DED GRAVEL (SP) MED PRN SM., WIST, LOOSE, TRACE 90 -. 100% POORLY CORTED AMILIE TO 5-10 5-11 100 - 110' SIMILARTO S-10 TO 1121 (SP 110-120! ROCK PRABNIANTS. PURPLE QUART TOP 0.0 CP PORT SORTED, 5-13 120-1301 ROUNDED, SOME ROCK FRAGMENTS, 7.00 WITH LT BROWN SAND, FINE, FAIR V CHARGE G SORTING ... 36-7 ET BRU, SM DRY TO MOIST, 130-1401 LOOSE, MODERATE GRAVEL (CM) WELL ROUNDED POOR SORTING TOH 000 " GM WELL ROUNDED, POOR SORTING 140-150 TO ANH! THEN MOD BEN SAI, WET, AND DONE LTBRN: SM, WET, MOIST; MORRATE. 150-160. GRAVEL.

EOB 2/17/89 DHE

FIELD BORING	LOG	BORI	NG NO. LOM-	8902B	
NOJECT NO.: 5753-	PROJECT NAME:	USATHAMA- BAAP		PAGE 1	OF 1
HILLING CONTRACTOR: LAY	NE-NORTHUEST	DRILLER: 6 . RODE	160EZ DATE STARTE	0 2/17/89 com	PLETED 2/18/8
ETHOO: DUAL WALL	CASING SIZE: 9	11 TIP eV	OU.O PR	NOTECTION LEVEL:	7
100MD ELEV .: 918.9	SOIL DRILLED: Ze	WATER LEVEL:	145.5	OTAL DEPTH: 198	200'
GGED BY: D BEL	AN CHECKED B	Y:	DATE:		

SAMPLE DEPTH IN NO. FEET		BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONITORING		
	,	o inches	REC.			TIP	LEL	
5-1	0-(01			DK BRN, SM , HOIST, LOOSE TRE GRAVEL		0.00		
5-2	10 -20'			MED-DK BEN, SM MOIST, LOOSE,	(SP)	0.00		
3-3	20-30'			MED BRU, SM, MOIST, COOSE, TRACE GRAVEL (FINE), WELL ROUNDED	(CP)	00		
5-4	30 - 40			MED BOW, STU - ML , MOIST, LOSE,	(SP)	00.0		
5 -5	40-50			MED BRU, SM -ML, MOIST, LOOSE SWARDED COBBLES AND GRAVE	(SP)	00.0		
5-6	50-GO			MED BRU, SM -ML, MOIST, LOOSE	es) Venarge	00.0		
3-7	60-70			MITH ONE BED BON THAT	(GP) @ 60'	00.2		
S-8	70 -80'			W/some MED - I BRN SM-	(49)	40.0		
5-9	20-90			SIMILAR TO 5-8-	(GP)	00.0		
5-10	90-100			OM, WELL ROUNDED, PAIR SORTING DITH SOME OF BRAN SM.	(SP) @100	0.0		
5-11	100-110'			CP_GM, WAL ROWDED, MAND LT BRN SAND, MOIST, LODSE, VORY FINE. FINE CAM NED	(96)	6.00		
5-12	110 - 120'			LITTLE LT BRN SAND, MOIST, LOSSE, LOSSE, CORBLES	SP)	00.0		
5-13	120-130			LT BRU SAND COBOLES	(CF) (ZD)	0.0		
७ -१५	130-140			WERY IT BRU SP, COBBLES	4	∞.∂		
5-15	140-1501			BEET IT ROW (AND SP	Cap) / cumae	00.0		
3-16	150 - 160			SP, SLT BRN, VERT FINECAING, WET, LOOSE WITH SOME ROOR LY SORTED GRAVEL	७ । ५६)	0.0		
-0	160-170				1	ထ.စ		
5-18		-		SIMILAR TO S-(6	-	00.0		
9419	190-190			SP, WITH SOME BRAVEL	4 / Compe	00.0		
5-40	1701-200			ew, Coebuss	CR CRO	00.0		

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FIELD BORING	LOG	BORING NO. LON 8903B
PROJECT NO.: 5753-08	PROJECT HAME: USATHAMA- BAAP	PAGE 1 OF 1
ORILLING CONTRACTOR: LAYNE	E-NORTHWEST DRILLER: G. RODRIGUEZ D	TATE STARTED 2/20/89 COMPLETED 2/20/89
METHOD: DUAL WALL	EASING SIZE: 9" TIP ev: 00.0	PROTECTION LEVEL: D
GROUND ELEV.:	SOIL DRILLED: 2001 WATER LEVEL: 144.5	TOTAL DEPTH: 200
LOGGED BY: D.H. Be	AN CHECKED BY: OATE: 2	24/89

SAMPLE NO.	DEPTH IN FEET	BLCWS PER	PEN.	OSCIPLIATION.	COMMENTS ON	MONITORING	
	resi	6- INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
2-1	0-10'			DK BRH . SP-SW MOIST, EDGE TRKE GRAVEL, WELL POURSED, MESORTIVE	·(cu)	0.00	
5-2	101-20'			SIMILAR TO 3-1	vermae @10'	0.00	
5- 3	20' -30'			DR-MEDBRN SH, SOME SW, MOST LOSSE, TR CW-GP.	*	e, ∞	
3-4	30-40'			SIMLAR TO S_3	ارد	ه. ص	_
5-5	40-50!			MED ERN SP, MIST, WOSE; SOME GW, MAL ROWDED	(**)	00.0	
5-6	50-60			MED GEN SP MOLS - WOSE, SOME	(3P)	00.0	
-	60 -70'			SIMILAR TO S.A	(40)	0.0	_
5-8	70 - 80'			MED BEN SP, MOIST, LOOPS, SOME GW	38)	œ.70	
3-9	80-90'			MED BRU 3P DAMP, LOOSE, V-FINE- FINE GRAHAD, SUE MUG, QUITH SOME- EW, WELL ROUNDED	(S P)	ه.ه	
5-10	90 -100 1				(SP)	pe.a	
3-11	100-110			MED BON SO DAMP LOOSE, VA FE, SUSANG WATERES SILL, WE PND	(38)	30.0	
5-12	110-120			ZM LAZ TO 5-11	30)	∞. a	
	لنحمته			3	(C) (Lange	000	<u></u>
3-18	130 -130			MED BRN	(GP) @ 128'	00.0	
3-14	133-1601			GN , SUBRNO - SUBANG, W/ CITTLE	(40)	ත. ට	
3-15	140-150			THEN SP WET, LOSE, VFC - FG W	(GP)	œ.ø	
5-16	150-1601			SP, WET, LOOSE, UEG-EG, WITH	(SP)	ه. ص	
	1/-22-07				(4)	00.0	
	170-1807			SP, WET LOOSE, VEG-PG, W/TRAC	(%)	00.0	
5-19	१४०-१९०			SP WET LOUSE BROWN VFC-FG		0.60	
5-20	190 -200			SAME AS ABOVE.	(30)	000	

DHB

2/20/89 DO HRS @ 200'

FIELD	BORING	LOG	Boring No.573-91-01						
Project No 6853-03 Project Name BAAP Page of									
Compactor MATHES Oritler K. Busselneyer Date started 10 - 14-91 completed 10 - 16-91									
Method HSA KNIE 75 Casing !		HNU 11.7/10.2	Protection Level D						
Ground EL Soil Dri	Hed 65'	4 below ground 62.	5 Total Depth 65'						
Logged by RHA Chec	ted by DRP	Date 10/14/6	11						

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TIME	Sample	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comment Advance of	s on Borne	Monit		571 572
13:56			2/4/6/9	2.6	Pak. Brown ckyon Silt; trane organics and coorse sand; dry, Tup Soil (ML)	Anolyti		JAR AIR	isks	31
1 4:01 59101007	5-7	5-7'	4/5/6/6		Dok, Brown fine to med. Send; Sine silt; truck	Anelyt	:L	S.	Bkz	31 ₃ ,
/4:11 SHOWE	s-3	10-15	5/1/6/1	25	dry, Top soil (511) Brown fine soul: 11th medican soul in secons (2"shield) is stringed dok brown; no thin condings on stained soil or edor; dry (5P)	Andyti	٧٢	24	31_	B 5
14-18	S-4	15-17	2/4/5/7	2.0/ 2.5	Tim medium Soud; trace for each coveres send; demp (SP)	Rufurun	દહ		73kg	140
14:26 59101622	5-5	20 - EZ	3/3 /4/5	1.5	Rrown medium Soud: Some course soud: +race fine soud and medium grandized starle brown silf. It expoemeth sample. is stained three brown in portions could be erjaming from play horizon/manne. (SP)	Anusyti	, . J.	G	(Sky	BL

FI	ELD	BORING	LOG		Bo	ring	NO. SPI
Project No 6853-63	Project N	arne BAAP				Page_	<u>7_ o1 _</u>
Contractor MATHES		Oriller K. Buts	elmeye-1	Date started	10-14-91	comple	ted /0 - 14
Meshod HSA/CME 75	Casing Si	284.25"	HNU 11	71(0.3)	Protection	Level	D
Ground EL	Soul Ornik		₹ per	ow groundly.5	Total Dep	in to	5'
Logged by RHA	Check	ed by DRP	Di	ne 10/14/91			

	Sample	Depth in	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring HNU LEL	sa.
14.35	5-6	30-32		2/ 1.5	Brown medium Sand; 1. He warse sand; trace fine sand and sitt 10 seems; damp. (5w)	Reference	TARIATE	D
14:50	s-7	40-42	કાંમીમીજ	1.6	Ten to brown medium send; little wearst send; trace fine to medium runderly rund and sitt. semiste pepperex whem.	Ruference	۵۴ ۵۱۶۸	ΠĻ
15:00	3-2			7.0	Ton from medium Sind; little fine snik; truck HM; dry (SP)	Zeference	at 3k2	ar.
15:15 ક્લાલનો	5.9	6c-6Z	्टोकी दश् टे	2.9/	Tin fine Soud; wat	Radytical	امل والدي	g:
15:32 Sqiotab7	5-10	65-67	4/10/15/26	2.9	Time fine Sind; wet	Andytical 7-62.5 T.D. 65'	03 Ph2	ગ્રા

FIELD	BORING	LOG	Boring No. 52 12
Project No 06853-03 Project	Name BADGE	.R AAP	Page_i ot _2_
Contractor LAYNE	Oriller G. Ros	RILUEZ Date starte	ed 10-9-91 completed 10-9-91
Mestod DUAL WALL Casing	Size Gr.	HNU 11.7/10.2	Protection Level 15
		4 below ground 6	5 Total Depth 196"
Logged by /C/C/C	ecked by	Date	
			

Sample	Degth in	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	MO		rng LEL
S-1	0-10'			LT BROWN SAND, WED, F.M., SOME GRAVEL, LITTLE CORRLES.		JAR	- +	0
	10-23			GULLAL ERRATIC BOULDER				
S- 2	23'-30'			LT BROWN SANDY GRAVEL, WGB, F-C GRAVEL, C. SAND, SOME CORBLES 2"-4" DIAM.	GW-68)		٥	0
5-3	30-40'			LT BROWN SAND, WGD, COARSE, SOME MEDIUM SAND, SOME FINE GRAVEL TR. CORBLES.	SW		0	•
s-4	40-50			SAME AS S-3 BUT W/ COARSE GRAVEL BED 45-46'			0	٥
s-5	50 -60			50-55': SIMILAR TO 5-3 55'-GO': LT BROWN SAND PGB, F-M, LITTLE C SAND TR. SILT TR GRAVEL	V (7)		υ	G
S-6	60 - 70'			LTBROWN SAND, PCD. F-M. LITTLE C SAND, TR. SILT, TR. GRAVEL	WATER TABLE AT 2 GG '		ပ	G
S - 7	70'- 3 0'	·		LE BROWN SAND, PGD. F, LITTLE MEDIUM, TR SILT.	(SP)		0	Ü
S-8	ga - 90'			SIMILAR TO 5-7	D			

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	FIELD	BORING	LOG		Boring No. 5 No. 5 No. 5 No.				
Project No	Project	Name				Page _ Z of }			
Contractor Driller		Onlier		Date started		completed			
Method	Casing	Size	HNU 1	1.7/10.2	Protection Level				
Ground EL Soil Drilled		1 T be	now ground	Total Depth					
Logged by	Che	cked by	5)ate					

ABD

Sample	Depth in	Blows per 6 inches	Pen	Description	Comments on	M	onite	orng
No	Feet	5 inches	Rec	Oese istra	Advance of Boring	_		LEL
5-9	90-100			SOME F. CRAVEL P. GN	50	TAR	AIR	0
5-10	100-110			C, SOME P. GRAVEL GD TR. LINE SAND WET		o	0	Ð
S-11	/10 -1 20			LT BROWN SAND P.CD C. TR. FGRAVEL SD	SAMPLE SEEMS FO FINE DOWN			
5-12	120430	•		SAME AS 5-11 SP	HEANING	U	0	
5-13	30 - 140			BROWN SOND , P.60, SI M-C , QUARTEITE CORRIE	9	0	o	S
5-14	140-150			SAME AS 5-13 SP CORREWING DOWNWARD TO SOME FINE GRAVE		U	•	ບ
2-15	150 460			SANDY IBIROWNY GRAVEL, WGD FINE, SAME COMPS! SAND, SOME MED. SAND TR. COBDILLS ATBITE		0	U	a
5-1 6	160-170			SAME A: 5-15		0	O	o
5-17	/70-180	·		BR GRAVELY SANT, WGA M-C. TR COBBLES		0	0	0

	FIELD	BORING	LO	G	E	Boring No.	
Project NO	Proje	ct Name				Page of	
Contractor Dr		Driller		Date started		completed	
Method	Casin	3 Size	HNU	11.7/10.2	Protec	tion Level	
Ground EL	Ground EL Soil Drille		1	below ground	Total (Depth	
Logged by Checked b		hecked by		Date			

Depth in	Blows per	Pen	Description	Comments on			
Feet	6 inches	Rec	DESC. ISCO.	Advance of Boring			
120-130			BROWN CLASSE SAND ED PERMED, WET TR. F. CROVEL	אל כשתואנ:	1	AIR •	Ü
(30-140'			MEN LOADSE BREWN SAND OWNER ZITE SP CUBBLE PCENSED		ગ	Đ	c
140-150	·		SAME AS 5-13 SP CONASCINO YOUNGEL		υ	c	0
15°0 - 160			BRE NN COARSE SAWS 4 FINE GRAVEL, SOME CEARSE URIVEL, SEME COARSE URIVEL, WELL COARSE URIVEL, WELL COARSE DIVET. TRANS	TO CETAZON	ပ	0	C
160-170			SINEAS 5-15		0	c	0
170-180			MED-COASSETSR, SAND WGRADED	·	ت	0	O
180-140			COURSE SAND AND GRAVEL (FINE-MED) EVELL GRADED. TR. MED SAND		0	ပ	O
	130-140' 140-150 150-160 170-150	Feet 6 Inches	Feet 6 inches Thec 120-150 140-150 170-150 170-150	RECE BORNES FOR BROWN CHARSE SAND (P) PORNED, WETTER, F. CRAVE MED. LOARSE BROWN SAND, OWNER SITE SP CURRIE, P. CRAVEN SAME AS 5-13 SP CONASCINIC DOWNARD TO SOME FINE GRAVEL, SOME CORREC CRAVEL, SOME CORREC CRAVEL, SOME CORREC CRAVEL, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OFFE, WELL CORRES OF	RECTORISE TO BESTITION ADVANCE OF BOTTOM 120-150	BROWN CHARSE SAND (P) FROM 120-130 TAR BROWN CHARSE SAND (P) FROM 120-130 TAR P GRADED, WETT FR. F. CANEL MED - LOARSE BROWN SAND OWALTETTE SP CURRE P CRADED SAME AS S-13 SP COMBINED TO COMBINED TO CONSTRUMBLE TO SOME FINE GRAVEL TO SOME FINE GRAVEL TO SOME FINE GRAVEL CORRES CARSE CANEL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER WELL CORRES OFFER	BROWN CHAISE SAND OF FROM 120-130 TARATE 120-130 BROWN CHAISE SAND OF FROM 120-130 TARATE 120-140 MED LOARSE BROWN SAND CHAITETTE SP CURBLE P. CONTENT COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP COMBUTETTE SP

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FIELD	BORING	LOG	Boring No. 52 41.
Project No 06853-65 Project N	sode BADGE	R A2P	Page _1 _ of _2
	10-9-94 completed 10-9-91		
Method SUAL WALL Casing Si	e g. O.D.	HNU 11.7/10.2	
Ground EL Soil Drille	190'	4 below ground 65	Total Depth /90

Sample	Depth in	Blows per 6 inches	Rec	Description	Comments on Advance of Boring	-		rng
S-1	0-10'	0 1013	NGC.	LT BROWN SAND, WED, F.M., SOME GRAVEL, LITTLE COBBLES.		TAR O		LEL
•	10 - 23'			CHCIAL ERRATIC TSOUDER				
5- 2	23'-30'			LT BROWN SANDY GRAVEL,	() ()	ပ	0	0
S-3	30-40'			C. SAND, SOME CORBLES 2"-4" DIAM. LT BROWN SAND, WGD, CORRSE, SOME MEDIUM SAND, SOME FINE GRAVEL TR. CORBLES.	54	0	0	
5-4	40-50			SAME AS S-3 BUT W/ COARSE GRAVEL BED 45-46'	90	0	٥	G
5-5	50 -60			50-55': SIMILAR TO 5-3 55'-60': LT BROWN SAND	50	0	U	ပ
s <i>-</i> 6	60 - 70'			PGB, F-M, LITTLE C SAND TR. SILT, TR GRAVEL LTBROWN SAND, PGD, F-M, LITTLE C SAND,		o	ဎ	O
S - 7	70'- 80'			IR SILT, TR. GRAVEL LT BROWN SAND, PCD. F, LITTLE MEDIUM, TR	5 <i>9</i>)	O	0	Ü
S-8	86 - 90'		•	SILT , SIMILAR TO 5-7	50			
		·						4

FIELD	BORING	LOG	Boring No. SPB-11-01						
Project No 6553-03 Project	oners No 6853-03 Project Name BAAP Page Z of Z Ontractor Matthes Ontiler K. Barselmey C. Date started 10-14-91 completed 10-14-91								
Contractor MATHES	Oriller K. Burs	elmeyer Date started	10-14-11 completed 10-14-11						
Method HSA/CME 75 Casing S	ze 4 . 2 5 "	HNU 11.71(0.3)	Protection Level D						
Ground EL Soil Onli	ea 65'	4 below ground(2.5	Total Depth 65'						
Logged by RHA Check	ved by DRP	Date 10/14/91							

	Sample	Depth in	Blows per	Pen Rec	* Description	Comments on	Monitorng	PA
TIME	No	Feet	6 inches	WEC		Advance of Boring	HNU LEL	150
	5-6	30-32	1/3/4/4	2/	Brown medium Sand;	Reference	TAR ATR 13/5.	D
14.35				1.5	little coorse soul;			
					truck fine send can silt			
					12 seums ; damp. (5w)			
		4 47	કાંમીમ/૨૦	2.0%	7			
4:50	5-7	40-72		1.6	·-	Reference	101/2 10/67	O
:			ļ		,			
] [trace fine to medium			
					runded yound and sitt.			
					demp (sw)			
	ا د د	.752	1./7/8/17	200				
5:00	3.6	3030			Ton framedina	Zeformer	BK RL2	- I cse
			İ	2.0	Sind; little fine sinch;			
		İ			truce HIM; dry (SP)			
			- دانواورای	2.0/	Tinfin Soud; wet	12 6	امام ودر	Ø
15:15 	5.9	60-00	1	2.0	The time Sand; wat	Reference:	1 17	
9101062					(57)	Analytical		Ì
. · 20	5-10	65-67	4/101.0	2.0/	The fine Sind; wet (SP)			
		0,3-6,	13/2		Time time simily well	Andytical	03 13kz	Jo
9101067				1,6	(3.7)			
						7 62.5		ļ
						T.D. 65'		
!						,		
			·					
		L	L		•			_[

FIELD	BORING	LOG	Boring No.573
Project No 6853-03 Project	Name BAAP		Page of
Contractor MATHES	Oriller K. Burns	schneyer Date started	10 - 14-9/ completed 10 14-9/
Method HSA/CHIE 75 Casing	Size 4.75"	HNU 11.7.(10.2	Protection Level D
Ground EL Soil On	Hed 65'	4 below ground £2.5	Total Depth 65'
Logged by RHA Che	owed by DRP	Date 10/14/91	

	Sample	Depth in	Blows per	Pen	Description	Commen	ts on	Moni	torng	ا يور
TIME	No	Feet	6 inches	HEC		Advance of	Boring	HNU	LEL	5724
13:56 59101012	1	0-2'	24/6/9	2.6	Prk. Brown ckyon Silt; trane organics and coorse sand; dry, Tup Soil (ML)	Andyt	ical	JAR AT	BKZ	31
1 4:01 59101067	S-Z	5-7'	4/5/6/6	2.9/ 12	Dok, Boson fine to med. Send; some silt; touch organics and warse smel,	Andyt	: uL	(ક્રા	BŁZ	131 _{3.}
/4:11 SHUIDIZ	5-3	10-12	5/1/6/7	29 1.7	dry, Top soil (500) Brown fine some : little medicen sond in secons (enduly) is string doth brown; no thin condings on strings soil or odor; dry (5P)	Andyt	ies	2		84
14:18	s -4	15-17	2/4/5/7	1.0/ 2.0	Tim medium Some ; trace for out course send; damp (SP)	Rufuren	، دو		73kg	Dr.
14:26 59101622	5-5	20 · 27	3/3 /4/5		Rrown medium Soud Some course soud + me fine scale and medium grand and storle brown silf. It exposure the sample is stained total brown) in portions - could be organice from play horsen/manure. (SP)	Anviyti	الده م ا	G	Sky.	BL

FIELD BORING LOG	Boring No. 521-51
Project NO CGSS3-03 Project Name BAS-CER AAP	Page 2 of 2
Contractor LAYNE Driller G. Rongwez Date	started 10.9.91 completed 10-9.91
Metros DUALL WALL Casing Size 9" O.D. HNU 11.7/10:	2 Protection Level &
Ground El Soil Drilled 190' 4 below gr	ound 65 Total Depth 190'
Logged by RK Checked by DRP Date 10	

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Sample	Depth in	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring			rno
5-9	90-100'			BROWN SAND, MOD. CAY		TAR		LEL
3-1	700			M.C. SOME FINE GRAVE		0	0	0
				TR. FINE SAND				
5-10	100 410			SIMILAR TO S.9	(34)	0	0	Ç
5 - 11	110 - 120						0	0
5-12	120 -130			BROWN SAND, PGD.	5P	0	0	0
	2			MED , SOME C SAND ,		}		
				LITTLE F SAND, TR		}		
5-13	130-140			GRAVEL , TR SILT . SAME AS S-12		0	0	0
					<u>(SP)</u>			
5-14	140.150			SAME AS 5-12	50	0	0	٥
5-15	120 -160			44 44	3 <i>B</i>	0	0	٥
5-16	160-170			BROWN SAND , PCB, M.C.	60	0	0	0
				LITTLE F GRAVEL, TR.				
				F. SAND, TR. SILT.				1
5-17	170-180			BROWN SAND, WGD.		0	٥	٥
				C, SOME MED. SAND,	50)			
				_				
	İ			SOME GRAVEL, TR FINE				
	}							
5-18	180-190			SAME AS S-17	(SW)	0	0	٥
				707 - 1001				
]			BOB. = 1901				
			·					
i								
	<u> </u>					1		

FIE	LD BORING LOG	Boring No. 574-91-020
Project No 06853-03	Project Name BADULL 4AP	Page _/_ of _2
Contractor LAYN	Driller G Robride 2 Date started 4-	125-91 completed 9-28-14
MEGTOG BUAL WALL	Casing Size 9" 0.7). HNU 11.7/10.2	rotection Level >
Ground El.	Sail Drilled /72' 4 below ground 631 To	otal Depth /92'
LOGGED BY RRR	Checked by DRP Date 10/10/91	

DSHOOWER

Sample	Depth in	Blows per	Pen Rec	- AUGUSTA	HNU	Comments on	Monite	orng
No	Feet	6 inches	ਜਵਟ	Description	19C	Advance of Boring	HNU	LEL
5-1	0-10'			LT BROWN, PGB, F. M SAND DAMP	o	·	0	٥
S-2	'ه - ه			LT BROWN, PGB M-C SAND SP DAMP	o		•	٠.
5-3	zo - 30'			SAME AS 5-2 SP	O		0	0
s-4	3 <i>o</i> -40'			BROWN, MOB. CR., M-C SAND, SOME F. GRAVEL. DAMP	o		0	
	40-50			NO SAMPLE				
S-5	50-60'			LT BROWN, MOD. COS, M-C SAND, SOME F. GRAVEL, TR. BOLANTS COBBIES	v		0	6
s-6	G0 - 70'			BROWN SAND PGA, F-M. WET	•	HIT WATER TABLE AT 63'	J.	0
5-7	70-8U			LT BROWN SAND P. GID., F.M., TR. COMPLE, TR. SILT WET	O	9 - 26 -91	o	0
5-8	30-96	·		SAME DS 5.7	0		σ	

FIELD	BORING	LOG	Boring No. 500-91-025
Project No 06853-65 Project I	same BADGE	R AAP	Page _ 2_ of 3_
Contractor LATNE	Dritter & Ro	ORIGINE Date started	9-25-91 completed 9-28-91
METHOS DUAL WALL Casing S	20 9" 0.0.	HNU 11.7/10.2	Protection Level D
Ground El. Soil Onli	ed /92'	4 below ground 63'	Total Depth /92 /
rooded by SSLS Cued	sed by DRI	Date 10/10/91	

ABD

Sample	Depth in	Blows per	Pen		Comments on	Me	onite	orng
No	Feet	6 inches	Rec	Description	Advance of Boring			LEL
5-9	90 -100			SOME F. CRAVEL P.CD	50	JAR	AIR	i
S-10	100-110			LT BROWN SAND AGD. C, SOME P. GRAVEL (SD) TR. ZINE SAND WET		o	0	ບ
5-11	/10 - 120			LT BROWN SAND P.CO C, TR. F GRAVEL SD	1 51.5 44 5 1 9			
5-12	/20 4 30			SAME AS S-11 SP	COIS IBEMBLE HOUNG	U	0	0
5-13	130-140			BROWN SAND , P.60, (SI M-C, QUARTEITE CORRIE	5	U	0	Û
S-14	140-150			SAME AS 5-13 SP CORRECTIVE DOWNWARD TO SOME KINE GRAVE		ပ	0	Ö
5-15	150 460			SANDY BROWN GRAVEL, WGB FINE, SOME CONSEL SAND, SOME MED, SAND		o	U	0
5-16	160-170			SAME AS 5-15-		0	O	υ
5-17	/70-180	·	-	BR GRAVELY SANT, WGD. M-C. TR COBBLES		0	O	0

FI	ELD BORING	LOG	Boring No. SPN-91
Project No 06853-03	Project Name 13400	en AAP	Page 3 of 3
Contractor LAYNE	Onler G. R	Date started	9-25-91 completed 9-28-87
MECTOS SUALLANG	(Casing Size 9" O.D.	HNU 11.7/10.2	Protection Level >
		4 below ground 63'	Total Depth /921
21212 to paggon	Checked by DR	P Date 10/10/11	

Ample No	Degth in	Blows per 6 inches	Pen Hec	Description	Comments on Advance of Boring	Monito	
				BROWN GRAVLLY SAND ((4)	TAPLATE	LEI
5-18	180-190				<u> </u>		٥
	·			F-M GRAVEL C SAND	SW		
				WGD			
		Bo	Ε.	192'			
	* w81			85-6 NO 43NO	- 84		
			1				
	DOE	TO M	BIL	TT TO PREVENT WEA	VING		
	SA	105					
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·	BORING		Boring No. 5PM . 91
Project No 06853-03 Project I	vame BABG	ER AAP	Page of _3_
Contractor LAYNE	Driver & Ros	RIGHE & Date started	10-8-91 completed 10-8-91
Method DUAL WAY Casing S	128 91.	HNU 11.7/10.2	Protection Level 5
		T below ground (60'	Total Depth Zoo '
Logged by 12212 Check	ved by	Date	

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Sample No	Depth in Feet	Blows per Pen 6 inches Rec		Description	Comments on Advance of Boring			LEL
5-1	0-10'			LT BROWN SAND F-M. PGD, TR COBBLES (PRACTURED)	(E)	TAR	ATR	
5-2	10-20'			LT BROWN SAND PGD. M-C TR F. GRAVEL, TR F. SAND	<u>(P)</u>	as	0	o
5-3	20-30'		÷	COBBLES 2-4", TR. F. SAND, TR F. CRANGE	<u>SD</u>	0	0	0
5-4	30-40'	•		LI BROWN SAND MOD. GRA, M-C. TR COBBLES 2".4" LITTLE FINE GRAVEL TR. F. SAND.	(P-SV)	0	0	O
5-5	40 -50			SIMILAR TO 5-4	SP-5W)	0	0	0
S-G	50.60			BROWN SAND PLD, M-C, TR FINE GRAPEL TR F. SAND	HIT WATER TABLE AT 60' (G) TRIPPED OUT TO CHANGE BITS ON CASING	/-/	0	,
5-7	60-70'			BROWN SAND, PUD F.M , TR SILT	(SP)	0	5:7	
5-8	70 - 80'		•	SIMILAR TO 5-7	(50)	0	0	0

FIELD BORING	LOG	Boring No sen-91-
Project No 06853-03 Project Name TSAN	our Aap	Page 2 of 3
Contractor LAYNE Driller C Page	ORIGUEZ Date started to	-8-9, completed 19-8-5,
Method DUAL MALL Casing Size 9"	HNU 11.7/10.2	rotection Level
Ground EL . Soil Oritled Zoo!	4 below ground 60' To	otal Depth Zog'
Logged by RRR Checked by	Case	

Sample	Depth in	Blows per	Pen Rec	Description	Comments on	M	onite	orng
No	Feet	6 mones	MBC		Advance of Boring	-	C	
5-9	80.90			80-871 - SIMILAR TO 5-7		TAX O	A O	a
				87'-90' BROWN SAND				
•				WGD . M-C, SOME	(1)			
				COARSE GROVEL, EITTLE				
				COBBLES , TR SILT		 		
5-10	90-100			BROWN GRAVELY SAND		0	٥	0
				WED, ALD, SOME				
				COARSE, LITTLE FINE	(54)	1		}
				SAND , TR SILT.		1		
				GRAVEL : FINE -MED	TOOK YOU	0	0	9
5-11	100-110			BROWN SAND MOD.	SAMPLES AT			
				LRA, M-C, Some	100'	ļ		
	•			F-M GRAVEL , TR COBBLES	5W-6W			
				TR E. SAND. TR SILT	3	<u> </u>	-	
5-12	110 -120			BROWN SAND PLD	(9)	0	0	0
				MED SOME COARSE,	<u>SP</u>)	1	1	
				TR FINE GRAVEL , LITTLE		}		
				F. SAND.				
5-13	120-130			SAME AS 5-12	50	lo	0	01
5-14	130 -140			SAME AS S-12	50	0	0	٥
5-15	140 -150			SAME AS 5-12	(30)	0	0	G
5-16	150-160			SAME AS 5-12 + 150-155'	Ta a	0	VZ.	20
	/30		l	155-160' D BROWN SAND	50		1	
				MED, PUB, SOME COLESS.				
				LITTLE F. SAND, TR F-M				
				GRAVEL, TR COBBILS.		1		
		1						

	BORING		Boring No. SPN-91
Project No 66853-affroiect	Name BAGO	ER AAP	Page 3 of 3
CONTRCTOR LAYNE	Orner & Rob	RIGUEZ Date Started	10-8-1/ completed 10-8-9/
Method Sual Wall Casing S	120 9"	HNU 11.7/10.2	Protection Level D
Ground EL Soil Onl	led 200'	4 perow ground 60'	Total Depth 200'
Logged by R RR Chec	ked by	Date	

Sample	Depth in		Pen Rec	Description	Comments on	Monitoring		
No	Feet	6 inches	mec .		Advance of Boring	HAU LE		
5-17	160-170	·		BROWN SAND, PGD, MLD. SOME COARSE, LITTLE FINE. TR SILT. TR COTESLES.	(53)		AIK 0	٥
5-18	170-186			SAME AS S-17	50	0	0	0
5-19	180.10			180-185 : SAME AS S-17		0	0	G
				185.190: BROWN 62A126 54ND, WCD, MED, SOME COARSE SAND.	500)			
				GRAVEL : F-M TR SILT, LITTLE F. SANO				~
S-Zo	/94 -Zaa			TSROWN SAND AND GRAVELY SAND ALTORNA; BEDS, M-C, WGD, GRAVEL: F-C, LITTLE K-SAND, TR SILT.	SU C	0	0	¢
		·		TSO TS = 202' AT 12:30	,			

FIELD BORING LOG	Boring No. 574-11-14
Project No CG853-03 Project Name BABGER AAP	Page [of
Contractor LAYNE Driller & RobauceDate started 9-	28-9, completed /0-2-91
Method DUALWALL Casing Size 9"0.D. HNU 11.7/102 Pr	otection Level
Ground El Soil Drilled 2:2' 4 below ground 48' Tot	S Deptn 212'
Logged by ZRR Checked by DRP Date 10/10/41	

Sample	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring		torng
		<u> </u>		OPENIC MATTER, DARK		JARIAI	I LELX
S-(0 - 16			TO LIGHT BROWN SAND W POB, FINE - MED.	SP) TECHNICAL PROFILEMS WITH P.L.D. METER	0	01
5-2	10 -20			LT BROWN GRAVELY SAND WGh, F-M III SOME CUARSE SAND. LAYERS OF COARSE GRAVEL, DRY VERY LOOSE	(W)	0	90
S-3	Zo - 30			LTBROWN SAND, MOS. US. M-C, LITTLE FGR. TR. COMESE GR		0	
5-4	3040			LT BROWN SAND GRAVELY SAMS WOR M-C SOME MEDIUM - CALLETE TRACE COARSE GRAVEL TRACE & 3" QUARTEITS COBBLES, DAMP	(S.M)	0	O
5- 5	40 - 20				HIT WATER TABLE AT 48'	0	G
S-6	50-60			FINE - MED TRACE FINE GRAPEL, WET	SP)	U	o
5-7	60 - 70	·		51mm 10 5-6	SB)	0	

FIELD BORING LOG	Boring No. SPN-91-040
Project No CG653-03 Project Name BADGER AAP	Page Z of 3
Contractor LAYNE Driller & RODRIGUE Date started	9-28-91 completed 10-2-91
Method BUALWALL Casing Size 9" O.S. HAU 11.7/10.2	Protection Level 5
Ground EL Soil Drilled 212 4 below ground 47	Total Depth Z12
Logged by RER Checked by DRP Date 10/10/41	

Sample	Depth in	Blows per	Pen	Description	Comments on Advance of Boring	\rightarrow	onite	rng LEL
				20 25' . 35	Dart & Ar	JAR		
5-8	70-80			70 - 75' LT BROWN SAND (SF	75' WATEL	0		0
		j		PGB F-M TR SILT				9
				75- 80' 73 ROWN SANDY	30000			
•				GRAVEL , SAND M-C, WED				
]			SOME COARSE GRAVEL	1			
	1			LITTLE COBBLES & 6" IN		0	0	G
5-9	80'-10	ł		BROWN GRAVELY SANGE	PI	l		
				Web , M-C , LITTLE COARSE				
				GRAVEL TR. SILT, TR FINE		1		
		1		44.3		0	0	0
5-10	90-100			BROWN SAND PCD, MED				
				SOME COARSE, TR. FINE			٥	٥
5-11	100-110			SAME AS S-10 WITH	P	0		
•				LITTLE FINE GROVE				
5-12	110-120			-	0			G
2-1-	110			SAME AS SILL		P		•
5-13	120-130			BROWN SAND M-C		0	0	•
				P.G.D. TR FINE GRIVEL	SD		1	
				TR FINE SAND, TR SILT				
• • •	/30-/40			SAME AS 5-13 (ED	0	٥	9
5-15	140-150			I SEAW A SAAR AND GA	· _ i		0	٥
				M-C, Some GRAVEL, TR. SIL	العنفا			
5-16	150-160			BROWN GRAVE, V CA IN				
_				WGD. M-C, TR. SILT	[sw]	0	0	•
				TR. COBBILLY & Z"_4"			1	
				BIAM.				
NO SAA	760-170							
.	170-180			NO SAMPLE	63			_
5-/7	70-70			ALTERNATING BLDS OF	(500)	0	0	0
				GRAVELY SAND, SANDY				
]			GRAVEL , AND SAND , M.C.	(ru)			
				WED., TR. SILT	T +			
	{			!		ſ		

FIE	LD B	ORING	LOG		Boring	NO. SPN-91-OND
Project No OG \$33-01	Project Name	· BADGE	<u>k</u>		Page	<u>3</u> or <u>3</u>
Compettor LAYNE	Dr	ther GR	שתישנהם	ste started	9-28-91 comp	leted 10-2-91
MESTOS BUAL MALL	Casing Size	9 " 0.0.	HNU 11.7/	10.2	Protection Level	4
Ground EL	Soil Drilled	212'	₹ pelow	ground 4/8"	Total Depth 2	12 '
Logged by TEAR	Checked	DRP	Date	10/10/91		

Sample No	Depth in Feet	Blows per 6 inches	Hec Hec	Description	Comments on Advance of Boring			rng
MO	Peer	O MOTES	, mec			-	170	
5-18	/80 - /90			BROWN SAND, PCD (SP) M-C, TR FINE GRAVEL TR SILT			0	0
S-/9	/90 •200 			SAME AS 180-190 SP		0	6	0
S-30	200 · 205			INTERTICIES OF CONST	BOE 212'	o	0	
			·	·				

G	BORING I	BORING NO. SPU-89-01C				
PROJECT NAME:	USATHAMA- BAA	ρ		PAGE	OF	/
THUEST	DRILLER: 6.	POOR16UE=	DATE STARTED 3/	29/89	COMPLETED	3/29/80
IG SIZE: 92		TIP ev: 0.00	PROTECTI	ON LEVEL:	D	7
DRILLED: 135	S' WATER	LEVEL: 63	TOTAL DE	PTH: 153	5/	
CHECKED BY:	gra.	DATE:	10(39			
	PROJECT NAME: ITHLEST IG SIZE: 92 DRILLED: 135	PROJECT NAME: USATHAMA- BAA ITHMEST DRILLER: 6. IG SIZE: 92	PROJECT NAME: USATHAMA- BAAP ITHUEST DRILLER: G. POORIGUES IG SIZE: 92" TIP ev: 0.00 DRILLED: 135' WATER LEVEL: 63	PROJECT NAME: USATHAMA- BAAP ITHWEST ORILLER: G. ROORIGUES DATE STARTED 3/2 IG SIZE: 92 TIP ev: 0.00 PROTECTS DRILLED: 135' WATER LEVEL: 63 TOTAL DE	PROJECT NAME: USATHAMA- BAAP PAGE RTHWEST ORILLER: G. ROORIGUES DATE STARTED 3/29/85 IG SIZE: 92 TIP ev: 0.00 PROTECTION LEVEL: DRILLED: 135' WATER LEVEL: 63 TOTAL DEPTH: 15	PROJECT NAME: USATHAMA- BAAP PAGE (OF OF OF OF OF OF OF OF OF OF

SAMPLE NO.	DEPTH IN	BLOWS PER	PEN.	DCCCR (DT LOU	COMMENTS ON	MONIT	TORIN
w.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
5-1	0-10			MED-DARK BRUN SAND, FINE BRAINED, PORLY GRASED, TRICE- LITTLE GRAVEL	768 Solv	00.0	}
5- 2	10 -20			WELL BONGED, WITH SOME MED AROUND	•	20. 0	
5-3	20-30			GRAVEL, NOL GRADED, FINE,	~ compe @ 30	00.0	
5-4	३ ०- ५०			ERNUEL, FINE, PERLY GRAND, LATTH TRACE COMPGE CRAVEL, SINCE MESON FINE SALO (LP)		ه,۵۵	
-5	40-50			LT BEN THOO, POOPLY GRAPED, FINE GLEAN, TRACE MEG SIME GRAPEL		00.0	•
3-6	9-60			FINE MENTAL WITH LITTLE FINE POUNDED GRANEL (4)		<i>⇔</i> ••	. -
5-7	60-70			ET BRUGNUD, POPRLY CARDED, FINE, SUBROUND - SUBRUG, SOME YO PINE ROUNDED GRAVEL, WET	5 0	ح صن 	
3-8	70 -90			FINE, TRACE FINE GRANT		40.0	
5-9	80-90			LTERNSTHO WET, POOPLY CENT	3 ()	-	
5-W	70-100			SIMILAR TO S-9	SP) No many @ 100'		
	100-110			ERRYEL, WELL GRADED & POUNE WITH SOME FINE ETERN SAND	(Im) Comit Suo	٥.0	
-12	110-120			SAND, LTORN, CLEMY FINE, GRAN	EL	ص. ن 	· · • • .
3-(3	120 - 130			PINE, WITH TEACE FINE CRAVE		00. 0	
3-14	130-135	•		SIMILAR TO 5-13	60)	0,00	
				60B 1310 HRS			
-							

FIELD BORING LOG PROJECT NO.: 5753- 08 | PROJECT NAME: USATHAMA- BAAP | PAGE | OF 2 GRILLING CONTRACTOR: LAYNE-NORTHLEST | DRILLER: 3. MELHOCH | DATE STARTED 4/14/89 | COMPLETED 4/14/89 METHOD: DUAL WALL | CASING SIZE: 94 | TIP ev: 10.6 | PROTECTION LEVEL: D GROUND ELEV.: 830.0 | SCIL DRILLED: 140' | WATER LEVEL: | TOTAL DEPTH: 140' LOGGED 3Y: 86M | CHECKED 3Y: 94. | DATE: 4/25/87

sampie No.	GEPTH IN	SECUS PER	PEN. DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONETOR:
		d-inches	REC.	אניאחנים כר שנייאטי	712
5-1	0-10		LT BROWN SAND, PGD, DAMP	FM, O-50 TPSOL	0
5-2	10-20		SIMILAR TO 5-1	(30)	0
5-3	20 - 30		BROWN SAND, PGD	F-M	0
			SA, LI SI, DAMP	SP	
5-4	30-40	,	BROWN SANO, PGO,		0
1			W TR-LI C SA, DAMP	(3P)	
5-5	40-50		BROWN SAND, PGD, 1	=-H, T C	0
•			54, 50 F-C GW, D	AMP SP	
5-6	50-60		SIMILAR TO 5-5 W/	HANKE	0
			IN COLOR TO LT BROW	N SP	
5-7	60-70		BROWN SAND, PGD TO		0
			F-M TO F-C SA W/T	R Lai	
			MOIST TO WET		
5-8	70 - 80		SA, LIC GROTORD GR		0
			7K 7 EL C 7KD 10 FD 01	- Change @ Bo'	
5-9	80-90		BEONN SILTY FINE SI	HND,	0
			T TO TE H SA, NON PLA		
1-10	90-100		BROWN SAND, PGD, F		0
			TR C SA TO F GRV,		
5-11	100-110		BROWN SAND PGD, F		0
			CHANGING TO WAD, F- SO F-C GRV, WGT	SP USW	

FIELD	BORING	LOG			BORING	NO. 5PN-89	tozc
PROJECT NO	.: 5753-	PROJECT	NAME: USATHAMA- BAAN	•		PAGE 2	; Z
ORILLING C	CHTRACTOR: LAY	TEBUKTROK-BK	ONITTEN: R N	Ectoen	DATE STARTED	4/14/89 COMPLE	TED \$/14/2
METHCO: D	VAL WALL	CASING SIZE:		717 ev: 10.	6 PRCTE	TION LEVEL: D	
CYCUNO STE	v.: 870.0	SCIL ORILLED:	140' WIER	LSVEL:	TOTAL	1401 : KTE3C	
LCGGED 3Y:			KED BY:		4 20/89		
							
SAMPLE	N: RTEBO	BLC4S PER	PEN.			COMMENTS ON	MONITORING
NG.	FEET	E3KJK:-6	REC.	OESCRIPTIC:	N	ADVANCE OF BORING	7:2 .EL
5-12	110-120			F SA, Se	940, H-C PHE F-C	water off cuttings had a zambon Sheen	0
 5-13	120-130		SIMILAR	TD 5-10	2_		0
5-14	150-140		Simila	~ 40 S	-12 SP		

FIELD BORING LOG	BORING	BORING NO. SPN-8903				
PROJECT NO.: 5753- PROJECT NA	ME: USATHAMA - BAAP	PAGE CF				
DRILLING CONTRACTOR: LAYNE-NORTHWEST	ORILLER: G. POORIGUEZ DATE STARTED 4	1/89 COMPLETED 4/13/89				
METHOD: DUAL WALL CASING SIZE: 9	TIP ev: CO.C PROTEC	CTION LEVEL:				
GROUND ELEV .: 815.3 SOIL DRILLED:	150' WATER LEVEL: 37' TOTAL	DEPTH: (450)				
LOGGED BY: D.H. BEAN CHECKE	34: 56. 4 27 89 DATE:					

SAMPLE	DEPTH IN	BLOWS PER	PEN.	l .	COMMENTS ON	MCNI	TCRING
NO.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
5-1	0-10			DARK-MEDIUM BROWN SAND, FINE-MEDIUM MODERATELY GRAPED, WELL GRAPED GR	(40)	∞.0	
5 -2.	10 -20			MEDIUM BRN SAND, FINE, FOORLY C TITLE POORLY GRADED GRAVEL, AND	(4P)	00.0	
5-3	20-30			MED-LT BRU SAND, FINE, POPLY OF SOME WOLL GRADOD GRAVEL, ROUT	prade o,	00.0	†
5-4	30-40			SIMILAR TO 5-3	(40)	00.0	
3-5	40 -50			T BRN SAND, FINE, POOLLY CA	1 (sp)	30.0	
3-6	50-60			GRAVEL POUNDED FAIR GRADIA WITH SOME STERV SAND	((((((((((((((((((((ه.ه	
5-7	60-70			LT BEN SAND, FINE, FOORLY O-TRACE FINE GRAVEL	crabes relayer	&.o	
5-8	70 -80	· · · · · · · · · · · · · · · · · · ·		LT BRN SAND, FINE, FOORLY GR	40EO (GP)	000	
5-9	80-90			SIMILAR TO S-8	(9P)	00.0	
5-10	90-100			SAND TO APPROX 94 FT. GT POUNDED, WELL GRADED.	(GW) (GW)	6.0	
5-11	100-110			GRAVEL, ROUNDED, WELL GRAD SOME LT BRN SAMD	EO, (GW)	ø.0	
5-12	110-120		:	LT BRASAND, FINE, POORLY TRACE FINE GRAVEL	(GW) Charge (SP)	0.0	
5-13	120-130			SIMILAR TO S-12	(4)	æ.0	
5-14	130-140			lt brnsand, fine, potily carpe trace finegravel		60. 6	
5-15	140-150			SIMILAR TO S-14	KP)	0.0	
	•		Bo	B@ 150', 1530 HRS.			
				ABMUDON HOLE (HERVING STON)			

FIELD BORING LOG	E	BORING NO. SPN-890+C					
PROJECT NO.: 5753-0 PROJECT NAME	E: USATHAMA- BA	AP	PAGE / QF /				
DRILLING CONTRACTOR: LAYNE-NORTHWEST	DRILLER: 6	RODRIGUEZ DATE	STARTED 3/30/89 COMPLETED				
METHOD: DUAL WALL CASING SIZE: 9		TIP ev: 00.0	PROTECTION LEVEL:				
GROUND ELEV.: 800.7 SOIL DRILLED: (7	30' WATE	LEVEL: 375	TOTAL DEPTH: 130				
LOGGED BY: D. H. BELAN CHECKED	BY:	4/10/99 DATE:					

SAMPLE NO.	DEPTH IN FEET	BLCWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONIT	CRING
	, cei	0-146452	REC.	UNDOLET LIVE		TIP	LEL
s- <u>1</u>	0-10			DK BRN SAND, MUDDY-SILTY, FINE, WITH SOME PROBLES(1)	LAL - TOPSOIL	0.0	
5-2	10-20			MED BRU SAND, FINE, PORTY CAME WITH LITTLE BULDE GENER (SP)	canje e co'	00. 0	
5-3	20 - 30			MED BRU SAND, FINE, POPELY GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRADES GRA	(32)	∞. ₀	N-1 1 - 1
5-4	30 - 40	·		MED BAN SAND, FINE-MEDIUM, FOORLY WITH SOME WELL GRADED GRADEL EMADED, SOME SUB AGULAR	(SP)	∞. 6	
3-5	40-50			WET, TRACE PORLY-MODERARE	(SPANNE)	20.0	
5-6	50-60		-	LT BRN SAND, FINE, PORLY GRAD WET, TRACE PORLY GRADED GRAVES	(48)	æ.s	
5-7	60-70			SIMPLAR TO S-6	 	ه.ه	
	70-80		•	TO APPROX 74 FT. THEN WELL ROUNDED GRADED GRAVEL, WITH	CAN)	∞.•	
5-9	50 - 9U			GRAVEL, WELL GRADED, MOSTLY ROW LITTLE SUBANGULAR, WITH SOME LT BRN PINE SAND, PARK WATER LUTH SCHE RAWBON EFFE	Braun (m)	000	
5-10	90-100			GRAVEL TO 95; THEN UT BRI FINE SAND, TRACE FINE GRAVEL	v change 95'	∞.0	:
3-1 (100-110			PORLY GRADED, SIGHT TRACE FINE GRADEL	m, (40)	20.0	
	110-120	•		LT BRN SAND, FINE, FOORLY GRADES VERY SLIGHT TRACE GRAVEL	(4)	∞.0	
1-13	120 - 130			SIMILAR TO 5-12	(SP)	00.0	
		-		BOB @ 1020 HRS.			

FIELD	BORING	LOG	Boring No. DBB-91-01						
Project No 6853-03 Project Name BAAP Page of									
Contractor MATHES	Ornier K. Bun	selmeyer Date sta	arted /0-15-91 completed /0-15-91						
Method HSA/CME 75 Casing	Size 4.25"	HNU 11.7102	Protection Level D						
Ground EL Soul C	rilled 115'	早 below ground	12/16 Total Depth /46.5						
Logged by RH4 Ch	ecked by DRP	Date 10/	6/91						

•

TIME	Sample	Depth in	Blows per	Pen Rec	* Description	Comments on		torng]
	No	Feet	6 inches	rec .		Advance of Boring	HNU		
og:00 Daloies	S-1	O-7	1/4/A/8	1.6	Robert; transgram fine Sura; Top 0.2-1.6 it. Brown for Stand; true	Analytical	Z.O Ph	┦).
Dalored Odiored		z-4	415-14 / ² 3	ار م	ungentes, and fortunal galleday. (SP) The to greenish-yellow istining for Sundy, slight chemical odor, blotches of black staining	Analytical	4.0 31	, Bky	
07:16 00000		4-6	2/4/5/E	وي الم	truck clayer - Alt in leases; dry; E can modion runder yould (SP). Betton 0.7'- LT boson Ckeyer-Sad; frace create Sence; Linidale 0.7-low Once fine send, Steined; Trace medium send;	ionaly ticing	5.0 8	ı ßk _⊅	i.
03: 27 Deioo3	s -4	હ ~ ઇ	5/6/6/·7	2/07	is middle 1.0 - 1.2. Black medine Soid, rish - Ismorely Tup 1.2 - 2.0 it. Brown Sondy-Clary: time medine Soid, dry (Sc/SP) yellow-jreen stained med. Sond; time corse Soid in somm (21) near tup of spoon; and medine connect grul.; dry (SP)	Analytical Sppm in rugar head.	. 03	1314	

FIE	D BORING	LOG	Boring No. DBB -9/-01
Project NO 6853-03 P	roject Name BAAP		Page 2 01 5
Contractor MATHICS	Oritler K. Bins	cheyer Date started 1	0 15-41 completed 10-15-41
Method 184/CIME 75 C			Protection Level D
	on Drilled 115'	4 below ground 2/16	Total Depth 167.5
Logged by RHA	Checked by DRP	Date 10/16/91	

	Sample	Depth in	Blows per	Pen		Comment on	l par		orng	5/2/7
TIME	No	Feet	6 inches	Hec	Description	Advance of Boring	HN	_		ان بحري
28:32	S-:5	8-1c	4/5/6/13	1.0	Button 0.7'- tim fine Shis; + me modina suls. under	Analytical	JAR	ATR		1.0
Deloiolo		쉳			you, indele 0.3-1.0' Silty fin. 3ché, grain string, Tup 1.0-7.0 olive med. Sand; some fine scal; Strined(gran); true const sand; damp SP/Sm/SP					
ુલ :46	S6	13-15	7/12/15/hi	2.0	Button U.?'- Tim median Stud; three for Sund and Horn; Top U.2-1.7 Diver (stained) fine send, slight chamical value; dry (SP)	·	ಳ ,ಲ	DJ.	Bky	7.
JIN1650	5-7	16-50	5-/16/n/15	2,4,	Strecked ton to olive for 30-2 (stronged); little median sound; dry(SP)	Analytical Driller having difficulty serving typerher 24" gazage	2.0	呇	13 K -	i. •
ک ^{ور 1610ء} کے	S~8	25-24.5	7/13/18	15/	Button 6.3' Ten to black Strenked 5.144 Send; grown to black liquid wreste; top 6.3-1.5 Ten fine send; dry (SM/SP)	erquid waster & 124.5 bgs. Analytical	ДА	و الم	BkL	15°
			·	•						

FIELD	BORING	LOG	Boring No. DBB-91-
Project No 68:53-03 Project	Name BAAP		Page 3 of 5
Contractor MATHES	Driller K. B.	schneyer Date sta	rted /u -/5-91 completed 10 -15-91
Method HSA /cmit 75 Casing	Size 4.25"	HNU 11.7/102)	Protection Level D
Ground El. Soil On	Med 115'	4 below ground	12/16 Total Deptn //6.5
Logged by RUA Che	oked by DRP	Date 10/16	5/91

TIME	Sample	Depth in Feet	Blows per 6 inches	Pen	* Description	Comments on Advance of Boring		onito		
					(RHU)		TAR	ATR	LEL	-
09:24	5-9	28-30	11/15/13/17	2-3	Tim Fore Soul - RAND	- Do State in in-	_		DK_	13/4
09101033			·	1,9	quality to medium soil	Analytical				
	·				dry; true mediangoli.					
					(SP)					
ويهندون	5-10	36-	11/11/12		in ha andina se in	Speir sown refusal			٠,	
707		40-41,5			LT- brunn medium sina;	of 38, - 9-11 +	W.,	 	114	1347
10:07					from everse soud, medical	40 'earl try e-sein.				
D9101042					(50)	Proficell dealing				
						itnatytical.				
						by Levely to				
						Drugen tabe	ŀ			
						(ither form, PCE,				
					,	i				_,
			~/s/.a	1.5/	7 on fine send, with	Analyticas	34	践	ぴ	الوك
15:21	5-11	42-43.5	7/14/12	/	medium sand ind fine	17mmy 1. C.s.				
D910104				1.5	runded grate, truck rock			1		
					rraficially (SP)					
	i			}						
	5-12	50-52	12/23/12/4	2,2	Tan modium soud : 11th			₂₄	1315	BK
10:33				3.1	for send; truck course	Anolytical	103	}	17%	1,2
POIOISS				1,0	send out for to worken					
					substanted governá roce					
					forts.; dry (SP)					
			·							

FIELD	BORING	LOG	Boring No. DBB-91-01					
Page 4 of 5								
Contractor MATURS	Ormer K.Bun	signicater Date started /	0-15-9 completed 10-15-4					
Method #54/cm675 Casing S	128 4.25"	HNU 11.74(0.2)	Protection Level D					
Ground EL Soil Dril	led 115'	4 below ground till	Total Depth // 6.5					
Logged by Riff Chec	ned by DRP	Date 0/16/4/						

TIME	Sample	Depth in Feet	Blows per 6 inches	Pen HeC	Description	Comments Advance of	s on Borng	Mo	enite U	rng LEL	جر مورا محرا
10:47	S-13	11.5 10-82		1.5	for medina Soul; little for soud; trace course send in for runding role dry, sougher person with or.			JAR BIL	ATT		BL
11:12 11:12	5-14	7 <u>0</u> -713	22/33/44	1.5/	Ten medium Soud; little fine and course sound; + new	Andyt	ک.,	刄	3 <u>}</u>	ВҚ	Bh.;
11:34	5-15	દળ જ્ઞાંગ્	21/45/18	5/5	for runded you at H.M.; dry (SP) The fine and medium soul; some fine to	Referen		8h-	74	TY ₄	ብ <u>ኝ</u>
3:41	5-16	90~71.5°	50/55/w	1.5/1.5	modium substanted gral.; Transcorres and; dry (Gw) Thorom 0.5'- The fine Sout; middle 0.5-1.0 Ten medium sud;	Analytic		81,	3 / ₂ .	74,	1362
9:15	5-17	NO-161.5	17/58/73	1.5/	Top 100 -15 Ton for	Reference	· (74,	残	85_	Ps-
			·		cul Winn; Middle 0.75- 0.85-72 medium semb; some fine to medium grate; TO 0.85 to 1.5 Tein fine sud; dy- (57)						

FIELD	BORING	LOG	Boring No. DBB-444
Project No 6853-03 Project	Name BAAP		Page 5 01 5
Contractor MATHES	Driver K. Bung	Lingue Date started	16-15-91 completed 10-15-91
Mesnos HSA /cm # 75 Casing S	4.25"	HNU 11.7/(02)	Protection Level D
Ground EL Soil Onl	led 115'	4 below ground 2/16	Total Depth 1176.5
Logged by ZHA Chec	wed by DRP	Date 10/16/91	

TIME	Sample	Depth in Feet	Blows per 6 inches	器	Description	Comments on Advance of Boring			ocuo	[
14:31	5-18						HN TAR	ATK		32
2111016					Ton fine sond; truce course soud; dry.	,	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	PY	3	,
14:50 p9101/17	5-19	115-1163	11/24/3/	1.5	Bottom 1.2' - Tumedium sud, 1.4te fur sud; true course scadeal for gali; wet. Top 1.0:1.5'	Analytical	βţ	δĻ	314	, ,
					The fine send, they levyer (19) them top of speech; dry.	T.D. 116.5				
• .					,					
			·	·						

FIELD	BORING	LOG	Boring No. DBB910Z
Project No U 15303 Project I	AHTAZU SMEN	MA BAAP	Page or3
		ANK Date started	10-15-91 completed 10-16-91
Method HSA Q 1/4. U Casing Si	že ——	HNU 11.74102 4 3	Protection Level D
Ground EL Soil Drill	ed 120'	4 below ground 1/8	Total Depth 122'
Lagged by P. LOUCES Check	ved by DRP	Date (C/(6/4)	

	Sample	Depth in	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	_	onito	
/03c	5-1		2/4/13/	2.0	Dak Berew Sect Greature to Eften Fight bear seed, 2" Acack Hoost of Ash type being ben sect & Berec.	Reference	34	AM	LEL
/è 35	S-2	2-4	′	2.0 1,2	FILL DARK PAZEWN SARTO W/ WELL REUNVIED GRAVIEL GRAVING TO BIAK MAGNA LCAY, MULST, STIFF, FILL	Sample Analitical Sample B9102004	gordo is	0,000	A LAMP &
/0 45			3/9/14/		SILTY (LANGER SILF SAND) TO FIND SAIND, DOK BROWN TO TAN, WELL ROUMS CONTROL	ANACITICA C SAMPCIE D910 2006	C	6	
1026	5-4	6-¥	5/7/9/ 13	1.6	MED BRW FINITSAND WELL RUNNALD FILMERS/GRINGEL CRNDING INTO LIGHT TAN MEDIUM SAND (WILL SCRIPS),	ANUICITICAL THERE D9102004	С	c	
1160	5-5	8-10	5/4/વ્યાં3	<u>ن.ان</u>	LIGHT THN MAD GIAN W/ WALL REGIONATO BERGERS	ANNCITICA <i>L หัเ</i> ห้า ว่าพฤเห็ Daloz 010	c	٥	
1110	5- 4	10-12	9/12/12/ 11	일 강	MED BROWN SAND & GRAVITE GRADING INTO CIENT THN FINE SAND (WELL SCRIED)	ANALYTICAL SHMIDLE NOT SENT	c	O	
1115	S-7	12-14		ડ્ડ) ટું જો ટું	FINE SAND, LOOSE, DRY	ANALITICAL SAMPLE DAIOSEIT	0	c	
1120	5-¥				LIGHT THE WELL SCRIED FINE SHAND LOUSE, DRY	Annicirical Samplit D9102016	O	0	
30	5-9	16-18	2/Uncjii	2.c i.7	Livies This, Finit Shind in/ Cressiskabling, with service, Lousie, Dry	ANALITICA SHIMPLE NOT SENT	o	0	

FIELD	BORING	LOG	Boring No. DBB-111-011
Project No6853c3 Project	Name USATH	IAMA BAAI	Page 2 of 3
Contractor MATHES	Orster T. C	RANK Date su	10.15.61 completed 10.16.91
Method HSA 44" Casing			#3 Protection Level D
Ground EL Soil D	med 120'	4 below ground	d 18 Total Depth ZZ'
Logged by D. LDUCKY CH	DRP TO BE	Date 10/16	5/91

Speen Barnannik

	Sample	Depth in	Blows per	Pen Rec	Description	Comments on			ring
:	No	Feet	6 inches	rac		Advance of Boring	1	_	LEL
1135	5-10	18-20	5/12/13/14	2.0 20	SAMR 1/3 5-9	AMMEITICAL SHIMPLE D9102020	JAR O	AFC C	
1140	5-11	30-27	¢ 16 11 17	3.0 3.0	LIGHT TON FINIT GIND GRADING TO LIGHT TAN MED. TAND W/ MALL ROUNDITD PRIMILES (10%), LOUTE	ANALITICA C SUMPLE NOT SENT	c	(C)	
1326	5-12	25-27	4/11/22/30	င္ပုင္ င္ပါက	LIGHT TAN FINE SAND W/ A 4" BAND SAND & WALL ROUNDED GRAVILL MIX, LOOSE	ANALITICAL SAMIXE D9102027	c	O	
1395	5-13	30-32	8 2c 24 23	2.0 2.0	LIGHT THN FINR SIND, DRY,	REFFICEILE SIMPLE	G	O	
1345			2/7/ ə /ধ		LIGHT TAN FINE SAND GRADING INTO TAN SICT, SUB RUMANING TO ROUMBRO CABITAL (15%) SCHETTLAND THROUGHOUT, SCHULLL MOITS, LEGAR	ANALITICAL SUMJECTE D9102042	С	c	
	S-15	50-54	¹ લોવા ગ્રહોત્	<u>०</u>) ५	SUB-REGION THIN FINIT SHIVED W/ ANGUAR GUMATETTE ROCK TO 2" LONG (30 %) MULTI LOUSE	Referenciect Simple Desces	e	c	
1430	5-14	Po- 2	\$ 30 <u>50</u>	1.5	BROWN COMPRESOND W/ RUNDED PREACTS TO LIGHT THE FINE SIND (WRLL SORTHO) TO MEDIUM THAT SAND W/ ROUNDALL) PRACES, LOUSE, MOIST	ANHLITICAL SAMPLIE D9102062	c	Ó	
			1				ł	1	1

FIELD BOR	ING LOG	Boring No. 788-91-02
Project No 685303 Project Name U	ISATHAMA BAAP	Page 3 of 3
Contractor MATHES Driller	T. CRANK Date started 10.	15.91 completed 10.16.91
Method HEA 414" Casing Size -	- HNU 11/102 # 3 Pr	otection Level
Ground EL Soil Drilled (2	o 4 below ground (18 To	tal Depth 172
Logged by D. Loucks Checked by	DRP Date 10/16/91	

SAUN BRESTUNE

Sample	Depth in	Blows per	Pen	· Description	Comments on	1	on t	orng
No	Feet	6 inches	Rec	Description	Advance of Boring			LEL
5-17	70-72	6/11/12/15	3.0 3.0	TAN, COMPART SAND W/ WILL ESCHOLD PRAMIES TO FINE LIBUT TAN SAND W/ WRLL RUMANO ALBERT, MOIST, LOOSE	ANALITICA C SWIMPCIE D 902072	O	ATR C	
5-18	%0~ %2 ∴	ાન વજ <u> કેન્</u>	1.33 1.33	LIGHT TAN, FINE SAND W/ WELL REGINATE PROSES (5%), MOIST, LOUSE	REFERENCE SAMPLE	O	¢.	
5-19	90-92	23/50/ 44/50	<u>2.0</u> 2.0	CICHT TAN FINIT SAND W/ CRAVEL KANDING FREM ISTACHES TO 15 INCHES WILL REMAILD, DIEVSIT, MUIST	ANALITICAL SAMPLE D9102092	c	C	
S-20	/CO-1C3	7" <u>20</u> 30 43	<u>1.33</u> 1.33	LIGHT TAN FINIT SAND IV/ SOUTHERD, WILL RUNNIED GRAVEL RANGING FROM IS IMINED TO 1.25 INCHED, DEWORD, MOINT	Reference sample	O	O	
५- २।	110-112	25/50/ <u>50</u> 3"	1.25 1.25	TAN, FINE MAND, WELL SCREED, DENOTE, MICHOT	ANALITICAL SAMPLIE D910"21# Z	O	ŗ	
5-12	120-122	2/3/2/2	3.0 3.0	TAN , FINIT SAND, WHILL SCIENTED, WET, VIEW LOCKE	ANALITICAL SAMPLIT D9102122	c	ť	
		·		BOB AUGERS 120' SPUIT SPOON 122'				

FIELD	BORING	LOG	Boring No. DBB-91
Project No 6853-03 Project N	arme BAAP		Page 01
Contractor MATHES	Driller K. Burs	selmeyer Date started	10-16-9/ completed 10-16-91
Method HSA/CME 75 Casing Si	28 4.25"	HNU 11.7/(0.2)	Protection Level D
Ground EL Soil Drill	nd 120'	4 below ground // 8	Total Depth /22'
Logged by RHA Check	ed by DRP	Date 10/16/91	

TIME	Sample No	Depth in	Blows per 6 inches	Pen Rec	* Description	Comments on Advance of Boring	Moni		- سنوا
67:42		Ŭ−1.5	5/6/12	1.5/	,	Reference	JAR AI	BRT	
94103054 Cities	S-2		1/1 L/ 30	1.3	soud, sound; true corse soud, fine to made grot, and organics; day (SP) Brun fine to medical, soud; little fine to medical, it race rule frage, and vijenke; dry. (Ew)	• • • • • • • • • • • • • • • • • • • •		Big	ह।
ეგ: ა 4	s-3	4,0-5.5	-યા/કળ/ <u>૨</u> ૬	i.5/	Brown fine to course sond; Some fine to course god; 1. Ale rock frags; dry (Cod) somet odor	Reference		Bk_	3k,
CE:17	5-4	(-7.5	૧ <i>૬ ૧૬ ૫</i>	1.5	Beron fine to racerse send; server fine tomerhim anythe ignal.; every (God)		ß	3k2	ם
હજ: <i>૧</i> ૪		8.0-9. 5	11/16/24	(.5) []	med such and fine to med, good day, sweet	Reformed Not enough recovery-surcting	1%	1242	31.
ს#ი3 ₆₁ ლ იგ: 3 <i>ę</i>	sk	10- 12	13/2 4/36/5 =	1.0	chemical udor. (SW) Olive med. Send; 114/h Fine agalar gall: ; +race correse sunch and rock freegs; sucret salar; day (SW)	Ancilytical	34,	342	ß
			-		(·)				

FIELD BORI	NG LOG	Boring No. DBB-41-03
Project No 6853-03 Project Name	BAAP	Page 2 of 5
Contractor MATHES Driller	K. Burselmover Date started	10-16-9/ completed 10-16-11
Method HSA/(METS Casing Size 4.25	" HNU 11.7/(0.2)	Protection Level D
Ground EL Soil Drilled 120	51/ Delow ground // 2	Total Depth /27
Logged by RHA Checked by [)RQ Date 10/16/91	

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TIME	Sample	Depth in Feet	Blows per 6 inches	Pen	Description	Comments on Advance of Boring	Monitoring	512.17 52.20
B: 54		12-14	16/17/16/16	-	Button 1.2' Olive (Stained) fine Sind; Typ 1.2-2.0	Ancilyhour	TAR AIR	1.0
					from malina soul; little fine sent; trave course sent and fine to madern grot, surest odor; dry (SP)			
18163xP 03:03	S-8	14-16	4/8 12/12	1.8	Button U.T. Ten to olive (stained) med send; trau fine mod; Tup U.T. 1.9' Olive (stained) for send, trau worse send, swent	Anastical	82 3E2	BKJ
ઝ૧ <i>૧૦૩</i> વઇ	s9	16-18	7/11/15/22	2.0	Softin 1.7' Ton fine Screp trace med. Scad; To 1.7 to 2.0' Olive (Stained) fine soud; true med	Anelytical	34 347	BK
બી ગુજરા ઇત : કરા	S-10	1B-20 ¹	9/16/33/21	2.0	B. Hum 1.3'- Tim fine such; trick make; sand, H.M. aid x-bedding; Tup 1.3-2.0 is brown softy fine und; true med sand; day. (SP/SM).	Analytical	35 Bt,	(Pk)_
0403025 0403025	5-11	20-22	9/18/20/32		^	Anilytics	Ø5. 13k5_	Biz

F	ELD BORING	LOG	Boring No. DB8-91-03
Project No 6853-0.	3 Project Name BAAF		Page 3 of 5
Contractor MATHE	S Onler K. Bui	Belmeyer Date started	10-16-91 completed 10-16-9
Method HSA/cme 75	Casing Size 4.25"	HNU 11.7 (10.2)	Protection Level D
Ground EL	Soil Drilled 120'	311 below ground 118	Total Deptn / 27
Logged by RHA	Checked by DRP	Date 10/16/91	

	Logged	by RHA	Check	ed by	DRP Date 0/16/91				1
'									-
TIME	Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monito	LEL	3 ~
09:37 จฤเชมใ	S- 1Z				Tan fine send; little med. Send, et brown sity fine send seem ("18") 0.5" from horturn; + mue Him.; dry (58)	Andyticas	TAR ATR		
09:45	5-13	30-32°	18/24/	2.0	Bottom C-1 cr. brun fine Send; little med. Send; middle ci. 1-1.6'. Ten fine Send; little med. Send; truce was a send and H.M. Top 1. u= 2.0 cr. brun med. send: truce fine and course send and fine runded grot. dry (5P)	Reference	6/2	Bky.	
10°04 D9103042	S- 14	40 - 42	15 kis/35/ 45	1.7	Ten med. Send; little fine and work send and fine to medin son brounded grot.; true reck frage; dry. (sw)	Analytical	84,	ያ ሉ ት	उ
10:20	5-15	5°0-5°1	12/18/26/38	i,ĉ	Button Cifi'- LT brown med soud; some fine grown and const soud; little fine soul; Top 05-10; Tou fine Soul; trace median to corre soul and fine rounded gov. dry. (Gu/SP)		3	D)T	L) I

FI	ELD	BORING	LOG		Boring No. 088-91-03
Project No 6853-03	Project A	ame BAAP			Page 4 01 5-
Contractor MATHES	Driller K. Busis	elmoyer	Date started	10-16-41 completed 10 -16-91	
Method HSA/cme 75	Method HSA/CME 75 Casing Size 4.25			7/(02)	Protection Level D
Ground El	Soil Dritt	ed 120'	T bet	ow ground (18	Total Depth /22'
Logged by RHA	Check	ed by DRP		ate 10/16/91	

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TIME	Sample	Depth in	Blows per	Pen Rec	' Description	Comments on	Monito		30c.
	100	Feet	5 Inches	MAC		Advance of Boring		LEL	<u> ""</u>
10:51 Daio30-2	5-16	60-62	2-132/5452	2.0	The fine Send; trace madical course send; this lands (14-1/5") of atternating LT. brown 5:14 fine send and	Analytical	TAR ATR	٠. ا	3L,
11:20	5-17	- <u>.</u> 70-72	5/A/25/1L	1' 1	the medium as course soul; thy. (57) The fire Such; 1.44 mod.	Reference	趻	Bkz	BL
				.7	send in lenses; trave were send; trave fine good all H.m.; dry,	6 mus et 75°			
11:47 D9103082	S-18	80-82	20/33/55/ 50 for 2"	/	Ten fine soud; little medium souland fine rounded grot; truce coerse soud and medium to temporarie grot; dry	Andrtical	G ² 5	Ūk _j .	BL,
14:00	5~19	96-97	12/20/37/sz	5.0 5.0	Ten fine Send; +race machine and course such and fine annotation. dry. (SP)	Reference.	1344-	734 <u> </u>	Bt
14:26 D9103162	S-30	/00-10Z	15/28/59/ 120 hr 3"	2.0	Porton 1.7' The fine Sond; 1. the median Sond; trace correct sond and H.m.; top 1.7-2.0 Brown fine sond; trace median sond; dry (5P)	Analytical	83-	7 5 ሄ_	B*.
			·	·	·				

FIELD	BORING	LOG		Boring No. Disk-1
Project No 6853.03 Project	Name 3.4A	P		Page _5_ of _5_
Contractor MATHES	Ormer K. Bin	oheyer	Date started	0-16-91 completed /0-/6-9/
Method HSA EME TO Casing S	4.25"	HNU 11	.7(10.2)	Protection Level D
Ground EL Soil Dril	led 120'	₹ bet		Total Depth /22'
Logged by RHA Chec	ked by DRP	D.	ne 10/16/91	

	Sample	Depth in Feet	Blows per 6 inches	Pen Rec	` Description	Comments on Advance of Boring			rng	F
TIME	No	Feet	o mones	HEC	Ann ibra.	ADVANCE OF BORING	HN	_	LEL	sa.
15:00	5-21	110-112	13/27/35/42	2.0	Tom fine sal; little medium sand; trace	Reference	JAR 头		びか	队
	•	 :			curry send out fine rounded grul. LT brown silvy fine send lense (FH (1") 1.5" from button of spoon; dry (SP)	colobles ex				
15:47 09103122	5-22	120-122	5/11/2-/19	2.01	Ton fine Send; +race medium sand; weT (SP)	7/18	31	By	5 kg	
:					(31)	T.D.				
						Analyteus				
-										
				·						

FIELD BORING	LOG		BORING NO. DBB-8901					
PRCJECT NO.: 5753-08	PROJECT NAME:	- AMAHTARU	BAAP		<u>"</u>	PAGE	/ OF 3	3
ORILLING CONTRACTOR: LAYS	ie-ncrthlest	ORILLER:	Ber Roo	Pac	DATE STARTED	1/11/89	COMPLETED	1/20/89
HETHOD: HSA	CASING SIZE: AL,	85°10	TIP eV:	#15	PRC	ECTION LEVEL:	C-dernal	
GROUND ELEV .: 899.5	SCIL DRILLED: /2	0.5	ATER LEVEL:	120	- Sel. 101	AL DEPTH: /Z	0.5'	
LOGGED BY: PLO/BM	CHECKED 8	Y: 9	2/27/89	DATE: /	17/89			

SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MCNITORING		
		- 1,10,163	REC.			712	Jead yx	
5-1	0-2	21-35-42-43	20	0-2 ly brobbroganic .2-18 ly brobbroadlo Fisa trouse		BK5	•	
- ゝ	· 2-4	3 4 -25-20-16	3.0	party graded, love, demp .8-10 clay love, alwe bown, plastic demp (clay cap?) plastic of right on top of the clay- 1.0-20—15 br he brown medter fri, tree Se, party graded, to one dance	Took Auclyheil	3.2	-3.9	
				. 8-1.4- Black med to fi sand (Burn layer) to grand, poorly gradd loose, direct 1.4-1.7 be to by bown clay, plantic, firm moist 1.7-1.8 be to by bown med to fi sa	(Fill)			
s- 3	4-6	8-7-9-7	20	poorly graded, loose, most 04 Deck med b f: se to come poorly graded, loose mont. 4-20 olue br med b fi sappoorly graded loose moish (50)	Teck thus You! (Fill)	10.3	-2.6	
5-4	6-8'	53-12-10 ·	2.0 1.9	- 1 La con (vernil colors) bis bo	Took Analytical (Fill)	-3.6	40	

Ak = -49 Ar. S. 1 1

FIELD BORING	LOG			BORING NO.DBB6701		
PROJECT NO.: 5753-08	PROJECT NAME:	USATHAMA- BAA	P		PAGE 2 OF 3	
DRILLING CONTRACTOR: LAYN	E-NORTHLEST	ORILLER: RE	Pre	DATE STARTED 1/17	84 COMPLETED //20/89	
METHOD: HSA	CASING SIZE: 4.5	<u>''10</u>	TIP ev: #15	PROTECTION	LEVEL: C Dermal	
GROUND ELEV .: 899.5	SOIL DRILLED: /2	0.5 WATER	LEVEL: 120	C' TOTAL DEPT	1: 120.5'	
LOGGED BY: PLB/BM	<u> </u>		Z7 89 DATE:	 		

SAMPLE NO.	DEPTH IN FEET	SLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONI	TORING
			REC.			TIP	Tel se
6- 5	6-10'	10-25-21-27	1.6	0-16 lg br to br malto fisc tr c Tr gr, loose, moist, wed graded (SW)	Auch hiel (Netwe) Vchenge @ 2 8.5	Bkg	-3.9
5-6	13-15	4-9-11-19	20	15 br to ten Fi Sa Tr mod, poorly gradel, losse maror, shore (stin?) straition between LD-1.6 (SP)	. •	bk5	-3.6
5- 7	18-20'	7-11-16-23	7.8	(strains) Course said loss at .5 - 16	Muglytical	30.1	-23
5-8	23-25	13-23-25-33		105-complety standed obin colors Ton Fi se to med, poorly graded, been moist, obin standing is layers thoughtable spoon. (Se)	Analyticail	274	
5-9	28-30'	11-26-4643	20/4	Ten is so to med satre, loose, moist, poorly graded, well stratified, some lipers 3" that (SP)	Analyteal	Bkg	-3.5
5-10	38-4/0'	12-40-66-100	1.5	0-1.1 dk tendo olive F; se, dry bo much as you go don't e spoon, very douse 1.1-1.4 Brige suf, to very F, send, non plane, moil, very stiff (51)	Hunkhinh	1800	127
5-11	40-42	23-35-34-2	3.0	0- 19 OK Beige sill, Tr very Fi sa men in monthing as you go down to saturated at .7-9 nonplantic, shift is .9-1.6 OK beige Fi to med set troove,	Analytical SA catacter Change Co		-2.1
5-1 2	42- 44	3-50-91-40	32.	0- 19 OK Beige sill, to very fi so men in morphore as you go down to saturated at 17-9 morphore sixth in the med so trocore, To 57 seel gooded, maint, sompect (SW) O3 OK olive fi sate med, poorly graded 3-1.7 OK Beige for to mal so tree, to fi med gry well graded, demp, dance (SW) Okach micross less at 1-1-1.4	Analytical	8.6	-2.9 •

FIELD BORING	LOG			BORING NO. DBB-8901			8901
ROJECT NO.: 5753-06	PROJECT NAME:	USATHANA- BA	AP			PAGE S	3 of 3,
RILLING CONTRACTOR: LAY	ME-NORTHIEST	ORILLER:	RO FRE	DATE STA	RTED //7/	89	COMPLETED 1/2089
ETHOO: 454	CASING SIZE: 4/3	ID	TIP ever 15		PROTECTION	LEVEL:	Dermol
ROUND ELEV.: 899.5	SOIL DRILLED: 120.	5' WATE	R LEVEL:		TOTAL DEPT	H: 120.5	5 ′
OGGED SY: PLB/B	CHECKED BY	: 55%.	Z/27/37 DATE:				

SAMPLE NO.	DEPTH IN	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONI	TORING
	FEET	1	REC.			TIP	ار جور
5-13	52-54	75-100 adad	رامز	Being Filmolou Trc, Tr Figr, poorly graded, compart, monit (50)	No Amalytical	BK	Herass -3.7
				V CUP S	2 ss' cobble conc began (chiter)		
5-14	62-64'	20-58-51-शू	2.0	Ly tantoton mod to Fi se, Trajir Fi gr, poorly graded, very dause, noist gravel layor at . 8 - 1.0 (SP)	Took Analytical	BKs	4.6
•				gravel layor as (31)	still in cobbles		
-15	72-74'	10-21-44-66	30	As above but what grayer	No Analytical	BKS	-4.0
5-16	82-84	10 -2+ 4+ 66 17-44-76-88	20/16	Lt Tarkotan 1-; to malsa tra (dec i am last-spoon), Trast, poorly graded, very dense, most, some strablication from F to a up deepth. (50)	Took Anaphical	BE	3.9
				The to be all deed.	285' end of cook zone		a 4
S-17	92-94'	38-53-82. W/4	1.8	Very danse, noish, some stratification C layers at . 5 6 and .9-1.1 (50)	No Analytical	ВКц	
5 - 18	107-104	18-63-65-76	303	graded very deroc, moist, so me		Brz	
	(12-114	21-61-193	弘二	I am fi to nead su, to c, poorly graded, very dame, mouth (SP)	Took Analytical	CK5	6kg
	又113.59 182-134 ¹	1-7-20-20	20 13	Ten Fi to ned sent peorly graded, very dense, sourcetel (50) BOB @ 120.5	Took And trial	Bris	BKg
				Bos e 120.5			
			Ì				
)				1000 E 190.2	·		

FIELD BORING LOG			BORING NO. D	88490Z
PROJECT NO.: 5753- 05 PROJECT NAME:	USATHAMA- BAAP		PAGE	1 OF 3
DRILLING CONTRACTOR: LAYNE-NORTHWEST	DRILLER: F. F.	cinz	DATE STARTED 1/10/89	COMPLETED 1/1/89
METHOD: 4.25" NSA CASING SIZE: 4.25	71	IF eV: /0.0	TE #/ PROTECTION LEVEL:	D
GROUND ELEV .: 897-9 SOIL DRILLED: 1/7	WATER LE	Ve .: //3	TOTAL DEPTH: 1/7	
LOGGED BY: J. Snowlon CHECKED BY:	2/27/89	DATE:		

SAMPLE NO.	DEPTH IN	BLOWS PER 23KON1-6	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MCNI	TCRING	_5P;
	19.0.		REC.			TIP	LEL	
5-1	05-2	18/15/15		Tan + Black sim-fra w//race mgvl, dry, m. dense, w. graded, remplastic Fill	Analitical Not Taken	0	0	
5-2	z-4	5/4/11/12	2.0	Dr Brown clayey of w/trace-little for, moist, siff, p. graded, mod. plastic Fill	Analitical Taken	0		
5-3	4-6	9/7/7/4	2.0	Dr Brown clayey si w/trace f-msq grading to a Brown si m-f sand w/seme med. gvl, moist, loose to firm, w. graded to w. graded, mad. plastic to non plastic Fill	Analitical Taken -Change @ 5.5'	0	0	
5-4	6-8	4/3/4/11		upper .6 similar to bottom cf5-3 .6-1.6-Tan f-m sa w/little si, trace gvl, moist, loose, well graded, nonplastic Fill-SP	-Change @n 7.5 Analdical NOT Taken	0	0	
5-5	8-10	NS	0	Not sampled due oriller error				0
3-6	10-12	17/18/13/1	2.0	Tan-L+Brown m-f sa w/trace - little si, hoist, loose, well graded (some med rounded gvl), nonplastic SP	Analitical Taken	0	0	
5-7	12-14	2/8/10/13	1.8	similar to 5-6 w/> med-f round gvl -sweet odor headspace = 0.3		O	0	
5-8	14-16	(-/-/-/-	2.0	SIMILAY to 5-6 (Sand becomes of	-Analitical Taken	.3	0	<.·
3-9	16-R	9/11/16/21	2.0 7.0		Analitical Not Taken	0	0	5
	P-20	1/5		Not Jampled				

PROJECT NO.: 5753-08 PROJECT NAME: USATHAMA- BAAP PROJECT NO.: 5753-08 PROJECT NAME: USATHAMA- BAAP PAGE Z OF 3 DRILLING CONTRACTOR: LAYNE-NORTHWEST DRILLER: F. HEJMZ DATE STARTED 1/10/89 COMPLETED 1/11/89 METHOD: HSA CASING SIZE: 4.25 TIP ev: 10.0 F PROTECTION LEVEL: D GROUND ELEV.: 997.9 SOIL DRILLED: 1/7 WATER LEVEL: 1/3 TOTAL DEPTH: 1/7

LOGGED BY: J. Snowden CHECKED BY 2/27/69 DATE:

SAMPLS NO.	DEPTH IN	8LCWS PER 6-INCHES	PEN.	DESCRIPTION	ADVANCE OF SCRING	MCN	TCR: NG	. 1
	FEET	GAINCHES	REC.	DESCRIPTION	ADVANCE OF SCRING	TIP	LEL	- 4
5-11	20-22	11/122/2		Similar to 5-6	Advanced boring to 25 to comple drilling 1/10 analytical Taken	ta		
5-12	25-27	7/14/24/22	2.6	dry fairly well sorted brown. (20 fn. grave jense (a 1.4 ft.)	Analytical taken	0	0	
5-13	30-32	8/15/22/34	2.0	30-31.8 Med sand well solved dry brown (SP)	Analytical taken	0	0	
5-H	40-42	14/21/25/20 24/35/50	2.0	40-40.7 Care i med. sand to of for grand, poorly sorted, prois thrown (SW) 40.7-41.4 Silt brown, moisk 41.4-42 Med. if a. that to of	Analytical Takto	0	0	
5-15	50-52	21/35/50	i	for grarely moist, brown (Su) poorty sorted, moist, brown (Su)	Reference sumille only			
- 16	60-62	45/1/2/9/50	1.5	med. sand very poorly sorted med. sand very poorly sorted moist, brown (50)	Amalytical for Kan 70.7 contact Con 70.7 my distance to	O.	0	 - -
5-17	70.72	10/41/100	1.8	dry poorly sorted. (SW)	reference sample only	0	U	
18	80-82	4/23/42/75	20		Analytical taken	6	6	

FIELD BORING LOG	BORING NO. DEBESSOZ
PROJECT NO.: 5753- 0 PROJECT NAME: USATHAMA- BAAP	PAGE 3 OF B
DRILLING CONTRACTOR: LAYNE-NORTHWEST DRILLER: F. Hein Z	DATE STARTED 1/10/89 COMPLETED 1/0/89
METHOD: 425" HS4 CASING SIZE: 4.25" TIP ev: /	O.D TE PROTECTION LEVEL: D
GROUND ELEV .: 897.9 SOIL DRILLED: 1/7 WATER LEVEL:	1/3 TOTAL DEPTH: 1/7
LOGGED BY: D. Differ . CHECKED BY: 7 2/27/89 DA	ITE:

SAMPLE NO.	DEPTH IN FEET	BLCUS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON	MCN	TCR:NG	
	<u> </u>		REC.	<u> </u>	ADVANCE OF BORING	7!7	LEL	- 5PA
5-19	90-92	9/20/25/46		porty sorted grading into a well sorted, brown, Errors sand	Analytica !	0	0	
2520	100-102	75/50 for • Z	1.0	red. sand, brown, dry, well sorted (SP) Silicons cidele prosent prosent in spoon of approx. 100 ft.	only	ъ	0	ن - ا
5-21	110-112	9/25/50 for 2		Same 45 5-21 (minus the silicenes couble) (Sample wet (2 the dip of the spoon)	Analytical to keen	8	0	The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon
5-22	115-117	12/25/16	20	coarse sand brown, fairly well sorted, brown (SW) WET At opprox 115' there is a very thin sill layer, grey, wet.	Analytical taken	0	0	T .
				E.O. B 113.7 WATER TABLE: 113				
						,		

FIELD BORING LOG	-	BORING NO. DEBSH3			
PROJECT NO.: 5753- 08 PROJECT NAM	E: USATHAMA- BAAP		PAGE / OF Z		
DRILLING CONTRACTOR: LAYNE-NORTHWEST	ORILLER: F. Hennz	DATE STARTED //7	84 COMPLETED		
METHOD: 4.25" HSA CASING SIZE: 4.	25" TIP ev: 10.0	TE PROTECTIO	N LEVEL: D		
GROUND ELEV .: 897.8 SOIL DRILLED: /2	2' WATER LEVEL: 119'	TOTAL DEP	TH: /224		
LOGGED BY: J. Snouten CHECKED	84: 950 2/27/89 DATE:		·····		

SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONI	TOR I NG
	PGE!	g-1 NChes	REC.	DESCRIPTION	MANAGE OF BOXING	TIP	LEL
3-1	0-2	4/1/12/8	z.0 1.7	Brown M-f saw trace sitt, am July, J. surded, nonplasic, losse SP	-nose of sks Ms sickly	0	0
5 -2	2-4	4/15/15/20	2.0	similar to 5-1	top of s/s has sicky	0	8
5-3	4-4	12/28/34/25	2.5	-si day layer @ 2.0' Similar to 5-1 w/ > gvl & cob	Analitical taken Analitical Taken	0	D
5-4	6-8	32/54/46/17	0.7	Lt-Brown silty m-frand wysme m-c gul, loose, dry, w. graded, nonplastio	-Change ©	8	
5-5	8-10	17/14/13/23	2.9/5	Brown si m-can w/some may, losse, mist, w. graded, nonplestie w/apparent solvent do	Analited Takes - Change @ 9.5 16	0	0
5-6	10-12	30/30/2/31		HBr-Tan m-fsa w/ Frace 31 + pittle m-gv1, bose, moist, w. sorted succet ador cont. (SP)	Analitical taken	1.0	
3-7	12-14	411/123	21/3	Similar to 5-6 w/sweet	Analitical Taken	.9	0
				(4)			
5-8	14-16	24/25/32/3	20	sent dor (cd)	Analitical Taken	O	
5-9	20-22	22/56/100			Analitical Change Ozi	0	
-10	25-27	18/34/98/50	2.0	Similar to 5-9 No net. sample (SNL)	Pralitical Taken	0	
		Herd Sp. screen of -ref cample	. ~c	Sample PF 5-1 - 3 5-2 - 60014 5-10 649 5-3 - 0-2 5-4 - 0-5 5-5 - 0-5 5-6 - 0-5 5-7 - 0-2	T P		

0.2 Backgrown

BORING NO. 088-4 9-0 3 FIELD BORING LOG PROJECT NO.: 5753- 45 PROJECT NAME: USATHAMA- BAAP PAGE ORILLER: F. Itcin Z 1/7/89 DRILLING CONTRACTOR: LAYNE-MORTHWEST DATE STARTED CCMPLETED PROTECTION LEVEL: D METHOD: 4.25" HS4 CASING SIZE: 4.25 " TIP ev: 10.0 TE 897.8 |SOIL DRILLED: 122' WATER LEVEL: 44 122' TOTAL DEPTH: GROUND ELEV.: CHECKED BY: SOP. Z12769 DATE: LOGGED BY: D. D. Hmar

SAMPLE	DEPTH IN	BLOWS PER PEN.		1	COMMENTS ON	MCNI	TCRING
NO.	PEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
5-11	30-32	34/25/32/23	1.5	dry. 31.5-32.00; somed. sound, and Sine gravel. poorly sirted / SPJ	Analytical sample	D	0
5-12	40-42	36/35/35/35		Med. sand and fine gravel, brown, trace for sand some course (SW) sand, maist, very p. sopted.	Analytical sumple	0	0
5-13	50-52	43/20/100 for	13/13	SAME AS 5-12, coarse-fine 3" sand lenge (2 50.8 (2W)	Analytica 1 Samp 16	7	0
5-14	60 - 62	24/49/60/5/	2.0	well sorted, brown, fairly dry.	Papprox. 60 ft. Analytical Sample	0	
5-15	70-72	53/94/49/100	2.0	70-71 - Coorse sand i for grave (SW) brown, p. sorted, dry. 71-72 - med. sand tr. of course sand, brown, fairly well sorted, dry.	reference sample only	0	0
5-16	80 - 82	14/15/13/23	2.0	same 45 5-15, 70-71	Analytical Sample	0	0
5-17	90-92	17/53/47/6	2.0	91.5-92 med and for sand, brown, tr. for	ret. sample only,	0	0
5-18	160-102	20/24/21/29	20	fairly w. Surjed dry (5P) Same as 5-17 91.5-92	ref. Sample only.	0	0
5-19	110-112	4/32/50/AL	2.0	Course : med sand, brown, fairly well Solled, wet a man 111.5 ft. # spron used as play to drill to 120.	I encountered dowing drilling at 179.8' Acf. Somple only	0	0
5-20	120-122	Blow in	2.0	med. ! Stine sand , brown , tairly well sorted met (SP)	Analytical Sample -not able to collect and solutions	0	8

BOB@ 122'

Sample do to Horizan running

	BORING	LOG			BORING	NO. Ded in	
RCJECT NO	.: 5733- CS	PROJECT	NAME:	usathama- Baap		PAGE 3 C	F 3
RILLING C	CHTRACTOR: LAY	NE-NCRTHLEST		ORILLER: 17. Heine O.	ATE STARTED //	77/77 COMPLE	TED 1/1/27
				25" TIP ev: /0.0		ICN LEVEL: D	
ROUND ELS	v.: 891.8	SCIL DRILLED:	120	WATER LEVEL: /22	TOTAL D	EPTH: /22 -	· · · · · · · · · · · · · · · · · · ·
.YE G3DDC.		CHEC	XED 3Y	DATE:			
Sample NC.	DEPTH IN FEET	BLCLS PER 6-INCHES	.K3s	DESCRIPTION		COMMENTS ON ADVANCE OF BORING	MONETORENE
] 	RES.			!	TIP LEL
				5-11 5-12 5-13 5-14 5-15 5-16), I		

F BACK GROUND

WARZYN

ENGINEERING INC

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Boring No. DBB-82-01
Surface Elevation 895
Job No. C. 10313
Sheet 1 of 2

... 1409 EMIL STREET • P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (608) 257-4846...

	S	AM	PL	E		VISUAL CLASSIFICATION	so	L PF	ROP	ERT	IES
	Reco	very	Mei	ture		and Remarks		w	u	PL	D
Ne.	Type	V	+	N	Depth		-	-	-	7.	
7	SS	18"	M	3	Εl	FILL: Mixture of Silty Clayey					
					F	Sand, Cinders & Tar Paper					
2	SS	12"	M	16	<u>E</u> 5-	Madday David As David Library					
3	SS	12"	M	24	E	Medium Dense to Dense, Light Yellowish Brown (2.5Y 6/4)					
	3	7.00		26	El	Fine to Medium SAND, Little Silt & Clay, Trace to Little					
4	22	12"	M	26	10-	Gravel, Occasional Cobbles (SP-SM)					
					E	Lang Cild & Clay Dwarent					
5	22	15"	M	20	E	Less Silt & Clay Present : from 8' to 15'	-				
	33	.,		-	E15-						
					E	Boring Completed to 10' on 3/10/82					
 6	SS	12"	M	15	F.,	501 mg 65mp redea 65 16 6m 6, 10, 62					
					20-						
					E						
7	SS	12"	M	49	E ₂₅ _						
					Ē.						
				<u> </u>		•					
8	SS	18"	M	32	<u>-</u> 30-						
					E			,			
				-	E	Dense, Pale Brown (10YR 6/3)					
					35-	Fine to Coarse SAND, Some Gravel, Little Silt (SP-SM)					
						draver, Electe Site (Sr-Sh)					
					F						
	-		_		-49-			 .		-	
					Ė !						4
					- - 45-						
						(Continued)					

WARZYN | LOG OF TEST BORING

Project	Badger Army	Ammunition Plant	•
Location		Wisconsin	-

Boring No. DBB-82-01
Boring No. DBB-82-01 Surface Elevation 895.3
Job No. C. 10313
Sheet 2 of 2

	S	AM	PL	E	•	VISUAL CLASSIFICATION	so	SOIL PROPERTIES						
	Recovery Meisture			and Remarks	4.	w	ш	PL	D					
No.	Type	ł	↓	N	Depth			-		n	<u> </u>			
					ململه	Dense, Pale Brown (10YR 6/3) Fine to Coarse SAND, Some								
9	SS	18"	М	43	F.	Gravel, Little Silt (SP-SM)								
-					- 50 -	End Boring at 50'								
					E									
					- - - - -									
					F.]						i			
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	_				Εl									
					E 85-									
			W	ΆT	ER	LEVEL OBSERVATIONS		NER						
	nile Dr	_		of C	Drilling	2.6'(Possible Perched Condition)	_ Crev	3/10/8 Chief	IG/SW	₹ig	5-1			
	ne Af pth to			9 -	10.8		_ Drillin	ng Met 0 10-	hod 0'	CS 0-	10'			
	oth to						DC (4	") 0-	10'		••••			

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION	SOIL PROPERTI				
	Reco	wery	Mei	leisture and Remarks			ш	-			
No.	Type	ţ	+	N	Depth		_ •		u	PL	
1	SS	18"	М	11	البليا	FILL: Mixture of Silty Clay, Sand & Gravel					
2	SS	18"	М	9	E ₅ _			_			
3	SS	18"	М	8	1111	Loose, Dark Yellowish Brown (10YR 3/4) Fine to Coarse SAND, Some Gravel, Some Silt & Clay, Occasional Cobbles (SM)					
4	SS	12"	М	30	E,_	Occasional Cobbles (SM)					
					1111	Medium Dense to Dense, Light Yellowish Brown (2.5Y 6/4) Fine to Coarse SAND, Some					
5	SS	12"	M	40	- 15-	Gravel, Trace Silt (SP)					1
6	SS	18"	M	24	20-	Boring Compléted to 20' on 3/9/82					
					ليليل	Dense, Light Yellowish Brown	1				
7	SS	18"	М	42	25-	(2.5Y 6/4) Fine to Coarse SAND, and GRAVEL, Little Silt (SP-SM)		· -			
8_	SS	14"	М	18	 30-	Medium Dense, Light Yellowish					
						Brown (2.5Y 6/4) Fine SAND, Little Silt & Clay (SP-SM)					
		-			- 35-						
·· · ·	_			-	1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-						
					45-	Very Dense, Pale Brown (10YR 6/3) Fine to Coarse SAND, Little Gravel, Little Silt & Clay, Occasional Cobbles & Boulders (SP-SM)					

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LOG OF TEST BORING

Project	Badger Army	Ammunition Plant
		, Wisconsin

Boring No	DBB-82-02 898.5
Surface Eleva	898.5
JOD NO (10313
Sheet 2	of2

	S	AM	PL	E		VISUAL OLASSISICATION	so	IL PR	ROP	ERT	TES
	Rece	very	Mei	sture		VISUAL CLASSIFICATION and Remarks	9.	w	ш	PL	
No.	Туре	\	•	N	Depth			•	u	PL.	D
					بليلياء	Very Dense, Pale Brown (10YR 6/3) Fine to Coarse SAND, Little Gravel, Little Silt & Clay, Occasional Cobbles & Boulders (SP-SM)					
9	ss	18"	М	60	E 50 -						
					الملطة	End Boring at 50'					
					- -55-						
					F.,	•					
					- 60 -						
				 	Εl	•					
					65-						
										_	
				L	E70-	·					
						·	}				
	_	_			-80-						
						·					
					_ 85						
			W	AT	<u> </u>	EVEL OBSERVATIONS	GF	NER/	<u> </u>	VOT	ES
Upo	ile Dri on Co le Aft	mple	tion	of D	rilling. 뉳 hou	NW	Start	3/9/82 Chiell	Comp G/SW ₁	olet&/5!	1.0/82 5-1
Deg	oth to	Wat	er	_	10.01	DM	FA DM/V	ng Meth 10-20' 10 20-	50';	DC(4'	0-10

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project	Badger Army Ammunition Plant	
Location	Baraboo. Wisconsin	

Boring No. DBB-8	2-03
Surface Elevation	897.
Job NoC10313.	
Sheet of	2

_1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

	S	AM	PL	E		VISUAL CLASSIFICATION	SC	IL P	ROP	ERT	IES
	Rec	very	Mois	ture		and Remarks	Qu	w	Ш	PL	B
No.	Ne. Type		→ N Dept		Depth		4.	-	ш	PL	
		10"	-			FILL: Mixture of Silty Clay, Gravel & Asphalt Shingles			-	-	<u> </u>
1_	22	18"	M	11		ar aver a nophar o oningres	┪	 	 		<u> </u>
2	SS	18"	М	17	F.						
	-	11			E.J	Medium Dense, Pale Yellow (2.5Y 7/4) Fine to Coarse					
3	22	18"	M	13		SAND, Trace Silt, Little to	-		-		
4	SS	18"	М	22	E 10-	Some Gravel (SP)					
					E"7						
					E						
5	SS	18"	М	22	15-						
					E "		1				
					E	Modium Dongo - Balo Vollay					
6	SS	18"	М	24	E 20 -	Medium Dense, Pale Yellow (2.5Y 7/4) Fine SAND, Trace Silt (SP)					
					-					i	
					E				<u> </u>		
7	SS	18"	M	24	25-				<u> </u>		
						Some Silt from 24' to 27' Water Appears to be Perched at 27'					
	<u> </u>				E		<u> </u>				
8	_s <u>s_</u>	18"	W	24	= 30-	Medium to Stiff, Light Olive	(1.0	}	<u> </u>		
				1		Brown (2.5Y 5/4) Clayey SILT, Some Fine Sand (ML)			}		i
· 	<u> </u>	L		<u> </u>	-		-				
	 				35-			 	 		
•					E						
							-				
	-			-	E 40-		 	 	 _ -	ļ <u>.</u>	
			ļ				(՝	Pocke Read i			neter
	 			_	E	Dense, Pale Brown (10YR 6/3) Fine to Coarse SAND, Little					
	-	 		-	45-	Silt & Clay, Some Gravel,		 	 		
						Occasional Cobbles (SP-SM)					
						(Continued)					_

WARZYN

ENGINEERING INC

LOG OF TEST BORING

Project	Badger	Army	Ammunition	Plant
Location			Wisconsin	************

Boring No. DBB-82-03 Surface Elevation 897.2 Job No. C. 10313 Sheet 2 of 2

	S	AM	PL	E		VISUAL CLASSIFICATION	SO	L P	ROP	ERT	'IES
	Recovery Moisture			and Remarks			l				
No.	Type	+	\	N	Depth		•	W	IL	PL	D
					الالالالا	Dense, Pale Brown (10YR 6/3) Fine to Coarse SAND, Little Silt & Clay, Some Gravel, Occasional Cobbles (SP-SM)					
9_	SS	18"	M	39	<u>-</u> 50-				 	-	
					1.1.1.1.1.55	End Boring at 50'					
K -				-	Εļ		 		 		
y											
				_	65 -						
, , , , , , , , , , , , , , , , , , , 					- - - -						<u></u>
					75-	·					
				 	80						
	 - 		-		F						
_	1		\\\\	/ΔΤ	-85- FR	EVEL ORSERVATIONS	GF	NER	AL	NOT	ES
WATER LEVEL OBSERVATIONS While Drilling Upon Completion of Drilling Time After Drilling 12.0:					GENERAL NOTES Start2/24/82complet2/24/82 Crew ChiefWG/JSig 55-1 Drilling Method CS 0-101 DM/W0 10-501						

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project	Badger	Army	Ammunition	Plant
	Na wak		li concin	•••••

Boring No.	DBB-82	-04
Surface Ele	evation	89
Job No	C 103	ا کا
Sheet	_	2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4648.

SAMPLE Recevery Meisture No. Type		SAMPLE VISUAL CLASSIFICATION						SOIL PROPERTIES					
			and Remarks	Qu	w	u	PL	0					
No.	Type	,	\	N	Depth				<u> </u>	PL.			
1	SS	18"	М	3		FILL: Mixture of Fine to Coarse Silty Sand, Clay,							
2	SS	12"	M	13	E-5-	Cinders & Brick Fragments							
3	SS	12"	М	31	F								
4	SS	15"	M	12	10-	Medium Dense, Pale Yellow (2.5Y 7/4) Fine to Medium SAND, Trace Silt, Occasional Cobbles (SP)							
5	SS	14"	M	12	15-	Seam of Very Silty Sand Encountered at 14'							
6	SS	14"	W	20	20-								
7	SS	12"	Н	19	25-	Trace to Little Coarse Sand & Gravel Encountered at 24'							
8	SS	15"	M	32	30-	Dense, Light Yellowish Brown (2.5Y 6/4) Fine SAND, Some Silt & Clay (SM)							
						Very Dense, Pale Brown (10YR 6/3) Fine to Coarse SAND, Some Gravel, Little Silt, Occasional Cobbles (SP-SM)					_		
						(Continued)							

WARZYN FROM INC.

LOG OF TEST BORING

Project .	Badger Army	Ammunition	Plant
Location	Baraboo	, Wisconsin	

Boring No. DBB-82-04
Surface Elevation 898.4
Job No. C. 10313
Sheet 2 of 2

. 1409 EMIL STREET • P.O. BOX 9636, MADISON, WIS. 53715 • TEL. (608) 257-4848 .

	S	AM	PL	E	-	VICUAL OF ACCIEICATION	SOIL PROPERTIES						
	Recevery Maisture			VISUAL CLASSIFICATION and Remarks			T						
No.	Type	ļ.	1	N	Depth		•	W	ш	PL	D		
					إدادا	Very Dense, Pale Brown (10YR 6/3) Fine to Coarse SAND, Some Gravel, Little							
9	SS	18"	M	58	- - -50-	Silt, Occasional Cobbles (SP-SM)							
					יויוין	End Boring at 50'							
					55			<u> </u>					
					الململ								
					F_								
					- 1	•							
					Εl	•	-		 				
					- 65 -	•					i		
					F								
					70 								
					-								
					75_ 								
					F <u>.</u>			,					
					- 80 -								
	-				+.								
5			W	ΔΤ	-85- ER	EVEL OBSERVATIONS	GE	NER	AL	TON	ES		
Up Tir	WATER LEVEL OBSERVATIONS While Drilling NW Upon Completion of Drilling				GENERAL NOTES Start 3/9/82 Complete 3/9/82 Crew Chief Rig 55-1 Drilling Method CS 0-10' DM/W0 10-50'; DC(4") 0-10'								
	pth t			•			DCC	4") 0-	יסו"		·····		

						/
FIELD	BORING	LOG		BORING	NO.DBN89	1-02
PROJECT NO	o.: 5753- 68	PROJECT	MAHE: USATHAMA- BAAP			CF
DRILLING (CONTRACTOR: LAY	NE-NCRTHGEST	ORILLER: 6 Rodorquey	DATE STARTED 2	-1-89 COMPL	STED 2/2/89
METHCO:)	valuall	CASING SIZE:	94" TIP eV: #10	PROTECT	ICN LEVEL: D	
	v.: 884.8	SCIL ORILLED:	160' HATER LEVEL: (C	S TOTAL D	EPTH: 160	
LOGGED BY:	FREDERIK	BRAGOW CHEC	CED BY: DATE:	2-1-89		
						BK=0.1
SAMPLE NC.	DEPTH IN FEET	BLOWS PER SOURCES Time	REC. PIN CONTROL FOR	ipsoilover	COMMENTS ON ADVANCE OF BORING Time / loteet (mf &	MONITORING
5-1	0-10	12:10	Br SAND Grovel		1:39	0.1
5-2	10-20	1:07	Br med SAND	(68)	3 , , ,	0.1
5-3	20 - 30	1:11	BR med SAMO w/ Som	re GREA Loyer	1:18	0.1
5-4	30 - 40	1:20	Br fito mudSA w	I mid 6. Grow	1: 38	0.1
5-5	40 - 50	1:23	SAME	6P	1:30	0.1
5-6	50-60	1: 26	same		0:54	0.(
5-7	60-70	1:32	Brown Med SA WI + @ 65' (hard) - 66'	Gravel (SP)	2:30	0.(
5-8	70-80	1:34	Brown Com SAND	w tare	1:19	0.1
5-9	80-90	1:39	· Brown SAW Grovel	Loyers	1;25	0.1
3-10	90-100	1:43	SAME	(4)		0.1
8-11	10-110	1:45	* wetalking of a set a set of cr s Br. SAND. a a gi		1: 19	0.1
8-12	110 - 120	1:51	water (May be US)	attop. (110 × change e 1	0.0
5-13	120-130	1:59	GRAV SA & SA Germal @ 121		7,	00
5-14	130- 140	2:40	sa Grarel much wat	er (GR	2.30	0.0
3-15	140-150	2:45	SA GRATE((CR	_ 0, 21	0.0
5-14	150-160	2:50	54 fine Grovel	(44	2:10	0.0

* a SIUT storted at 100 may se 5-8' HATER at max

FIELD	BORING	LOG		BORING NO	o. DBN-89	1-04B
ROJECT M).: 5753-	PROJECT N	ME: USATHAMA- BAAP		1	OF 3
RILLING (CHTRACTOR: LAY	NE-NCRTHLIEST	ORILLER: G. Rodriquez	DATE STARTED 7	Seb/x7 COMPLE	TED 7 Feb ?
METHOD:	Kammer	CASING SIZE:	9,12. TIP est:	PROTECTION	LEVEL: D	
SCANO ET	v.: - 917-)	SOIL ORILLED:	93-0-14 WATER LEVEL: -/	105/ TOTAL DEPT	H: 180 31	1951
CGGED BY:	J. Bu			7 Fel / 79		
SAMPLE NO.	DEPTH IN	BLOWS PER 6-INCHES	PEN. DESCRIPTION		COMMENTS ON ADVANCE OF BORING	MONITORING
·····	7441	D-TACAES	REC.!			TIP LEL
S#1	0-1054		Brown silty fine to with gravel + Cobbbo TILL well	Medium SAND les, moist, ounded cobbles	smooth runs	0.9
S#2	10-2051		Brown grading to Medicin SAND gravel (Angular)			0.1
#3	20-305A		Brown Fine angue mediam to fine St	2051. (6P)		0.1
S#4	30-4054		Slightly moist. Brown medium to . coarse gravel (ang	Sine grave with		0.0
			Sine to medium so Note: The majorit gravel app consist of linestone so a little she	pears to dolomite + agments with		
5*5	90- 6 051	1	Brown median to wif little sine of occasional col	Sine Sand		0.1
*6	60-70 50-505		Frown Crse to 1 wt/ same sine gra	Med Sand		0.1

	BORING LO		USATHANA- BAAP	RING NO. DBN - 29	of 3	
RILLING C	ONTRACTOR: LAYNE-		DRILLER: G Rodriquez DATE STA			-/0
ETHCO:	anner cu	IING SIZE: 9)		PROTECTION LEVEL: 17	ETED 7 F	₹0 Z
ICUNO ELE		OIL DRILLED: 186		TOTAL DEPTH: 1804		
GGED BY:	J. Buss	CHECKED 8		20/19		
		•	- Life E	-C6/ 6/		
EJAMPLE NO	1 1 1 1 1 1	ILCUS PER PEN	•	COMMENTS ON		CRINC
NO.	PEET	4-INCHES	- DESCRIPTION	ADVANCE OF SCRING	7:2	151
- Z	70-805		* pounding on bowlder as	+ 735X X	-44	į
•			Brown Coanse to Fine.	_ 1	04	! !
			at some grave. TIL	1		
			duy.	2(54)		
8	500 00 0			en his	j	
0	80-9051		Brown Sine to Course St.	air line ,	10.0	ĺ
			with cobble zones dry			ĺ
1				5/0Wad:and	<u>-</u> .	
#9	90-1005		Brown med to crose S	AND		
			at/some Sine Sand and		0.0	
			grave! dry ((36)		
			2 11/1 11/1			
#/0	100-1105		Brown Med to Son SAND	l l		
			Little Croe Sand and gr	ave/	0.1	
			200	(SP)		
# //	110-120.51.		Brown Fine Sand, 1	for a		
• •			Med Sind and accos,	A		
			1 had		0.0	
				- 1		
*/2	120-130		Brown Fine - Med San	d.		
			treguese Dry to slightly	mais /		
				(4)	0.0	
13	130-140		Brown Fine -mad Soul	T/ 1	Ì	
			tree gravel wet at 140 St	water at	0.0	
) weld 170 51	140 St.		
	1					

FIELD	BORING				BORING I	NO. DBN-87	
PROJECT NO			NAME:	USATHAMA- BAAP			' 3
	CHTRACTOR: LAY			U. NOZIFIEUEZ		760 0	TED FIRED
	Hanner	CASING SIZE:	نز کر	TIP ey:		CH LEVEL:	,
	W.: 917.7		190		TOTAL DE	PTH: 180 5/.	195
LCGGED SY:	Jim Ba	CHEC	YE CEX	DATE:	7/Feb/88		
SAMPLE	DEPTH IN	BLOUS PER	PEN.		İ	COMMENTS ON	MCN ! TCR ! Y
NG.	PEST	6-INCHES	REC.	DESCRIPTION	<u> </u>	ADVANCE OF SCRING	TIP LEL
S-14	140-150			Brown Med-In San gravel and cobbles we No siff	et, (SP)		0:1
S-15	150-160			Evan Med. Fine S at Tree gravel. a No Silt los	vers (SP)		0.2
5:16	160-170	166 54		Sine-med Sand of Siff lense	ccasiona/	change 160'	0.2
5-17	166-170			siff at 166 St, bro	own wt	I do	0.2
5-18	170-180		·	Fine gravel with so. to fine SAND, grav coarser with depth		Change @	0.3
	180-# 18 0 95	·		Feb 9/89 boring exter 190 St to accommodate Sands brown Crse-Med Si Gravel	nded to heaving	·	

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

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	S	AM	IPL	E		VISUAL CLASSIFICATION	sc	IL P	ROP	ERT	IES
	Rec	every	Mai	sture		and Remarks			Ц	PL	D
No.	Туре	+	\ \	N	Depth				LL	, r.	
		-				16" TOPSOIL		}	 		
	SS	18"	M	6		Stiff to Very Stiff, Dark Brown	(2.5	 	 		
2	B"ST	14"	М	-	KL I	(10YR 3/3) Silty CLAY (CL)	(1.5	i			
					E"]	ST Pushed Hydraulically at 100 PSI					
3	55	18"	M	6				-			
4	92	16"	M	26	E 10	Loose to Dense, Yellowish Brown		 	1		
	-		<u> </u>		E"	(10YR 5/4) Fine to Medium SAND, Little Silt & Clay, Some Gravel					
					E	(SP-SM)					
5	ce	12"	<u> </u>	40	Εl	More Coarse Sand and Gravel			†		
_2	133	12		40	E15-	Encountered at 14'					
					F						
··	SS		 	-	EI		_				
<u>.6</u>	132	4	M	30	E20-		-	 			
					F		:	l			
	+			-	ŧ l	Medium Dense to Dense, Pale Yellow (2.5Y 7/4) Fine to		 	 		
	<u>SS</u>	12"	<u> </u>	30	E 25-	Medium SAND, Trace to Little	ļ	<u> </u>	<u> </u>		
					Εl	Silt & Gravel (SP-SM)					
	╂				Εl	·			-		
8	LSS	18"	М	40	-30-	Boring Completed to 30' on 2/23/82	 		-		
					Εl	•	Γ	Pocke Readi	r Pen	etron SF	ieter
	┿		-	-	El		-	ļ			
_	 	-		\vdash	35-	Boring Completed from 30' - 176' on		 	-		
					E	3/19/82 - 3/22/82	ļ			l	
			<u> </u>	-	El	Unit: SAMS-1 Chief: Mark O.		<u> </u>	-		
	 -	-		+-	├ ₩┤			-			
					E						4
	+	<u> </u>		-	£		-		-		
	-	 		-	F45-			 	 		
						(Continued)					i

ENGINEERING INC

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

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	SAMPLE					VISUAL CLASSIFICATION	so	L P	ROP	ERT	IES
		very	Mais		190-16	and Remarks	q.	w	ш	PL	D
NO.	Type	•	*	N	Depth				<u> </u>		
					FΙ						
					F	Lost 80 Gallons of Mud from					
					E50-	0' - 50'					
				<u> </u>	-	•					
9	SS	18"	M	82	F.	Very Dense, Light Yellowish					
					\$5-	Very Dense, Light Yellowish Brown (10YR 6/4) Fine SAND, Some Silt & Clay (SM)					
					E	•					
					E 60-						
_					EI						
				_	FΙ						
					-65-	Lost 175 Gallons of Mud from					
					E	50' - 80'					
					Εl	·	-				
				-	E70-						
					F						
				 	F						
					75-				_		
					E						_
10	ss	.4"	M	125	-80-	Very Dense, Light Yellowish			 		·
					E	Brown (10YR 6/4) Fine to Medium SAND, Little Gravel, Little Silt (SP-SM)					
					E	Little Silt (SP-SM)					
					85-						
					E						
				-	Εl	. <u></u>					
				-	F-90-			-			
						(Contact					



LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

Boring No. DBM-82-01
Surface Elevation ...917
Job No. ... C . 10313
Sheet 3 ... of ... 4

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-	S	AN	IPL,	E.		VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	TES
		very	١.	sture	·	and Remarks	Q⊎	w	LL	PL	D
No.	Type		+	N	Depth						
11	SS	3"	M	119		Very Dense, Light Yellowish Brown (10YR 6/4) Fine to Medium SAND, Little Silt, Little Gravel (SP-SM) Lost 175 Gallons of Mud from 80' - 120'					
12	SS	6"	М		120- 125- 130- 130- 135-	Very Dense, Light Yellowish Brown (10YR 6/4) Fine to Medium SAND, Little Silt, Trace Gravel (SP-SM) Boring Completed to 130' on 3/20/82					

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LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin She

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	s	AM	IPL	E		VISUAL CLASSIFICATION	s	0	IL PR	ROP	ERT	TES
		very	Mois			and Remarks		lu .	w	ll.	PL	D
No.	Type	•	+	N	Depth	\					-	
					E	, ,					<u> </u>	
					E	\			ļ			
					140							
					E	1,						
		. —			E							
				-	145	Ver .		_				
					<u>-</u>							
					E	Hard, Yellowish Brown (10YR 5/4)]					
					-15 0-	Silty CLAY, Trace Sand (CL)	}-					
		1				1)						
					E	7	-					
13	SS	<u> 18'</u>	M	147	-1 55	A	4.	5+)			
						\mathcal{A}						
						Boring Extended an Additional						
					E160-	20' to get Below Clay Stratum	-					
							-				·	
-						- Sween-	┪					
					165	- 15	;)	Pocket	Pene	trom	eter
							,	'	Readin	g, T	F	C 0C1
					-	Very Dense, Yellowish Brown (10YR 5/4) Fine to Coarse						
	-	·			1 70	SAND, Little Gravel, Trace Silt (SP)		-			\dashv	
						<u>-1</u>						
_					<u>-</u>		-	-				
	35	211	אר וויי	130	775- TIONS	End Poping at 1761	<u>ا : :</u> : :		NER		—— 	
				. KVA	II TOMS	End Boring at 176'						
	ile Dri on Co	_			rilling		_ St _ C	ar ev	2/23/82 v Chi e f	NG/JS	plete/ Sig	5-1
Tim	e Afl	er D	rilling		k hou		_ P	rilli A	ng Met 10-30'	hod C	S 0-	10'
	oth to				25.0'	Moist	-	••••	10-30	, UM/	MU 3	0-1/07

LOG OF TEST BORING

Project	Badger Army Ammunition Plant
Location	Baraboo, Wisconsin

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	s	AM	PL	E		VISUAL CLASSIFICATION	SC	OIL I	PROF	PER	TIES
	Rec	very	Mei	ture		and Remarks	-				
No.	Type	+	+	N	Depth	7" TOPSOIL	<u> </u>	W	u	PL	-
1	SS	18"	M	16	E.*	Stiff, Dark Brown (10YR 3/3) Silty CLAY (CL)	(1.5	5			
2	3"ST	16"	М	_	X_{5}	***	亅	_	42.	4 20.	2
		·×			臣。」	**					
3	SS	18"	M	22		Medium Dense to Dense, Light Olive Brown (2.5Y 5/4) Fine					
4	SS	7"	M	42	E 10-	to Coarse SAND and GRAVEL, Little Silt & Clay (SP-SM)	_	-		+	-
					E	•					
5_	SS	12"	М	65	E 15-					-	
_						Medium Dense to Very Dense,					
6	ss	18"	М	26	20-	Light Olive Brown (2.5Y 5/4) Fine to Coarse SAND, Some Silt & Clay, Some Gravel (SM)					
					E	office cray, some draver (SM)					
7	SS	9"	M	38	25-						
								,			
8	SS	12"	M	38	30-	Boring Completed to 30' on 2/24/82		 	-		
					E						
					35	* 2' of Frost Present					
					E 33	<pre>** Light Yellowish Brown (2.5Y 6/4) Fine to Medium SAND, Trace Silt & Gravel (SP)</pre>					
·- • ··					F.,			1		T	
(_				-40- E-	*** Shelby Tube Hydraulically Pushed at 600 PSI	()		et Pe		neter
					E ₄₅]			-			
						(Continued)					



LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Boring No. DBM-82-02
Surface Elevation 918.2
Job No. C 10313
Sheet 2 of 4

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	s	AM	PL	E	•	VISUAL CLASSIFICATION	so	IL PF	30P	ERT	TES
	Reco	very	Moi	sture		and Remarks	Qu	w	и	PL	D
No.	Type	+	+	N	Depth		 			r.	
					50-	Boring Completed from 30' - 155.5' on 3/19/82 Unit: SAMS-2					
9	SS	18"	М	95	55-	Chief: Tom O. Very Dense, Light Yellowish Brown (10YR 6/4) Fine to Coarse SAND, Some Gravel,					
					1	Little Silt & Clay (SW-SM)					
10	SS	18"	M	79	85-	Very Dense, Pale Yellow (2.5Y 7/4) Fine to Medium SAND, Trace Gravel, Trace Silt (SP)					
						(Continued)					

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

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	S	AM	PL	E.		VISUAL CLASSIFICATION		IL PF	10P	ERT	IES
		very	Mois			and Remarks	Qu	w	LL	PL	0
11	SS	18"		N 45	Depth S O O O O O O O O O O O O						
12	ss	12"	М	98	1-1-20- -1-25- -1-30- -1-35-	Very Dense, Pale Yellow (2.5Y 7/4) Fine to Medium SAND, Trace Silt (SP)					

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ENGINEERING INC

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Boring No. DBM-82-02
Surface Elevation 918.2
Job No. C 10313
Sheet 4 of 4

1409 EMIL STREET . P.O. BOX 9538, MADISON, WIS. 53715 . TEL. (608) 257-4848.

		AM			•		60	OIL PR			150
		wery	Mois			VISUAL CLASSIFICATION	30	/IL PI		EKI	153
No.	Туре	MEIA	m 013	N	Depth	and Remarks	qu	w	ıı	PL	D
13	ss	-	M	-	145	Hard, Yellowish Brown (10YR 5/4) Stratified Silty CLAY and Fine SAND (CL/SM)	4.5		u.	PL	D
14	SS	18"	W	139	155	End Boring at 155.5'	-				
					-160- -165- -170	No Mud Loss During the Drilling Operation	()	Pocket Readir	Peng, T	etrom SF	eter
					175-	LEVEL ODGEDVATIONS					
Up Tin Del	ile Dron Cone Afoth to	ter C wa	etion Orillin ter	of C	rilling 1/2 ho		Star Cre Drill	ENER 2/24/8 w Chief ing Met 10-30 1/W0 30	32 _{Com} WG/J≨ thod	plete Sig . 5 CS 0	/19/82 5-1

ENGINEERING INC

WARZYN | LOG OF TEST BORING |

		Boring No.
Project	Badger Army Ammunition Plant	
	***************************************	Job No
Lanation	Baraboo, Wisconsin	10000

Boring No.DE	3N-82-	Q18
_		^^-
Surface Ele	0313	
Sneet		

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S	AM	IPL	E		VISUAL CLASSIFICATION	so	IL P	ROP	ERT	IES
	overy	Mois		Depth	and Remarks	qu	w	LL	PL	D
No. Type				09 50 50 50 50 50						
				E -						
While D Upon C Time At Depth to	ompk fter E o Wa	etion Orillin	of C		LEVEL OBSERVATIONS	Star	NER 3/22/8 v Chief ng Met	TO F	plets	23/02 A



ENGINEERING INC

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

Boring No. DBN-82-	010
Surface Elevation .	
Job No. C 10313	
Sheet of .	1

. 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

	S	AM	IPL	E		VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	IES
	Reco	very	Mais	ture		and Remarks	Q.	w	LL	PL	D
No.	Type	+	+	N	Depth		1		LL	FL	
					F						
					E						
					E ₃₀₋						
					F	NOTE: For more detailed					
				}	E	subsurface information, refer to Log of Test					
					<u>-</u> 60-	Boring No. S-1122					
					E						
					Εl					,	.
	 1				- -90-	Drilling from 75' - 167' performed on 3/22/82					
					E90-	periormed on 3/22/62					
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	-			_	-		1				
			-	 	E 50		1				
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		<u> </u>		 		End Boring at 167'					
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			<u> </u>	10=	<u> </u>	LEVEL ODGEDVATIONS		NICC	<u> </u>		
	<u> </u>					LEVEL OBSERVATIONS		NER 3/20/8			/22/82
		_			Orilling		Star	t' v Chief	Corr	plete Rig S/	AMS-2
	ne Af						Drilli	ng Met	hod [)M 0-	167'
	pth to			-				••••••	•••••		•••••••
. De	pth to	o Ca	ve In	_			1				

LOG OF TEST BORING

Project Badger Army Ammunition Plant	
Location Baraboo, Wisconsin	

Boring No. ELB-82-01
Surface Elevation 899.2
Job No.£ 10313
Sheet 1 of 2

.1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

<i>_</i>	S	AM	PL	E		VISUAL CLASSIFICATION	sc	OIL F	ROF	ERT	ΓIES
	Rec	very	Mois	ture		and Remarks	8.		Τ.,		
No.	Type	+	+	N	Depth		_ <u>_</u>		ш	PL	0
1	SS	18"	М	7		Stiff to Very Stiff, Dark Yellowish Brown (10YR 4/4)	2.0)			
2	в"ѕт	24"	М	2	X 5	Silty CLAY (CL) ST Pushed Hydraulically from 3-5'	[1.3)	26.9	19.8	3
3	ŞS	12"	M		F	Loose to Medium Dense, Dark Yellowish Brown (10YR 4/6)					
4	SS	16"	M	18	- 10- - -	Fine to Coarse GRAVEL and SAND, Little Silt, Occasional Cobbles (GW-GM)					
5	SS	15"	М	20	- 15-	Medium Dense, Yellowish Brown (10YR 5/4) Sandy SILT (ML)					
6	SS	18"	М	20	20-						
						Medium Dense, Yellowish Brown (10YR 5/4) Fine to Medium SAND, Little Silt & Clay					
7	ss	18"	M	16		(SP-SM)					
					لدلدار	Medium Dense, Pale Yellow (2.5Y 7/4) Fine to Medium					
3	SS	15"	M	27	30-	SAND, Some Silt & Clay (SM)					
						* Greater Percentage of Sand than Gravel noted at 9'	-				
					-35- - -						
								Pocke	Dor	atro	neto-
		_				Occasional Gravel and Cobbles Encountered at 43'			ng, 1		
					-45-						
			Ì			(Continued)	1.]]		



LOG OF TEST BORING

Project Badger Army Ammunition Plant Location Baraboo, Wisconsin

Boring No. ELB-82-01 Sheet 2.... of 2

	S	AM	PL	E		VISUAL CLASSIFICATION	so	IL PI	ROP	ERT	TIES
	Rece	very	Meis	ture		and Remarks					T
No.	Type	+	+	N	Depth		•	W	u	PL	D
						Medium Dense, Pale Yellow (2.5Y 7/4) Fine to Medium SAND, Some Silt & Clay (SM)					
9	SS	18"	M	22	E ₅₀ _	**	(1.5	b			
					3 55 6	End Boring at 50'					
					\$5- 	** Stiff, Light Yellowish Brown (10YR 6/4) Silty CLAY, Trace Fine Sand (CL)	()	Pocke Readi	t Penng TS	etro	meter
					-70-						
					- 80 - - - - - 85 -						
			W	AT		EVEL OBSERVATIONS	GE	NER	AL N	TOP	ES
Upo Tim Dep	le Dri on Cor e Aft oth to	mple er Dr Wat	rilling er	الح	nilling_ hour 0'DM	·	. Drillin	/12/82 Chief G 19 Meth 0 10-5	od CS		

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Boring No	ELB-82-	02
Surface E	levation	90-
Job No	C 103	13
	! of	

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

	S	AM	PL	E		VISUAL CLASSIFICATION	sc	IL	PF	ROP	ERT	TES
	Rec	every	Mei	sture		and Remarks	Q.	Π		ш	PL	
No.	Type	↓	+	N	Depth			<u> </u>	W	<u> </u>	71	
1	SS	18"	М	10	<u> </u>	Stiff, Dark Yellowish Brown (10YR 4/4) Silty CLAY (CL)	1.5					
2	3"ST	16"	M	-		Shelby Tube Pushed Hydraulically from 3-5'	1.5					
3	SS	9"	М	15		Medium Dense, Yellowish Brown		-				
4	SS	12"	М	21	10-	(10YR 5/6) Fine to Coarse SAND, Some Gravel, Little Silt, Occasional Cobbles (SP-SM)						
5	SS	18"	M	28	E 15-	Color Change to Light Olive Brown (2.5Y 5/4) at 9'						
						Medium Dense, Very Pale Brown (10YR 7/4) Fine SAND, Little	1					
6	SS	18"	М	13	20-	Silt (SP-SM)						
7	SS	18"	М	21	5-25-	Medium Dense, Light Olive Brown (2.5Y 5/4) Fine to Coarse SAND Gravel, Trace Silt		-				
3_	ss	18"	М	2	7 5 30	Medium Dense, Light Olive Brown (2.5Y 5/4) Sandy SILT (ML)						
	-					Very Fine to Fine SAND, Trace						
					35-	Silt (SP)	()	Po Re	cke adi	t Per	etroi SF	meter
					40							
					45-			-				
						(Continued)						

LOG OF TEST BORING

Project Badger Army Ammunition Plant LocationBaraboo, Wisconsin

Boring No. ELB-82-02 Surface Elevation 902.8 Job No. C 10313 Sheet2..... of2.....

le.	SAMPLE Recovery Meisture					VISUAL CLASSIFICATION	SOIL PROPERTIES							
le.	Mect	very	Meis	ture	—].	and Remarks								
	Type	1	↓	N	Depth		•	W	Щ	PL	C			
					FI	Very Fine to Fine SAND, Trace Silt (SP)		-						
İ			ł		FH	3110 (3P)				1				
	 			ļ	上	*			ļ					
)	SS	7"	М	80	生如上				<u> </u>					
					F-1	End Boring at 50'								
			Į		FI	•			1					
	 			<u> </u>	上									
	 			L_	E55-	# N								
					F"	* Very Dense, Light Olive Brown (2.5Y 5/4) Fine to								
	}				FI	Medium SAND, Some Silt	1 1							
	 			<u> </u>	Εl	& Clay, Little to Some Gravel,								
					E _{so} _	Occasional Cobbles (SM)								
					FI]]							
					FI									
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<u> </u>					85-									
			W	AT	ER LE	VEL OBSERVATIONS		NER.						
	ile Dr on Co	_		of C	orilling		_ Start	Chief	Com /SW p	pleta/.	15/8 -1			
Tim	ne Afi	ter C	rilling) 	k hoŭr-		_ Drillin	g Met	hod C	5 0-1	0'			
)er	oth to	Wa	ter		13.0'DM		DM/.\	NO10- 1") 0-	50!	. 	 -			

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

Boring No. ELB-82-03
Surface Elevation 910.4
Job No. C 10313
Sheet of

_1409 EMIL STREET • P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (606) 257-4848.

	S	AM	PL	E		VISUAL CLASSIFICATION	s	0	IL PF	ROP	ERT	IES
		very	Meis	stare	I	and Remarks	Ţ	þ	w	ш	PL	0
No. T	ype	. 🕈	*	N	Depth		╁					-
1	SS	18"	M	11	Εl	Stiff to Very Stiff, Dark Yellowish Brown (10YR 4/4)	(2.	0)				
		3.011		<u> </u>		Silty CLAY (CL)	-					
2 3'	.21	18"	M		 	Dense, Pale Yellow (2.5Y 7/4)						
3	SS	18"	M	41	FI	Fine to Medium SAND, Little Silt, Occasional Cobbles (SP-SM)						
4		12"	M	40	ŧΙ	Stit, occasional comples (SF-SM)	-					
+	33	12	<u> </u>	40	E10-		+					
					-	Very Dense, Pale Yellow (2.5Y 7/4) Fine to Coarse						
5	??	12"	M	80	ŧΙ	GRAVEL and SAND, Little	-	_				
				100	E15-	Silt (GP-GM)	厂					
					E							
6	SS	18"	M	14	F							
					E ²⁰	Medium Dense to Dense, Pale						
					E	Yellow (2.5Y 7/4) Fine SAND, Trace to Little Silt (SP-SM)						
7	SS	18"	M	32	E ₂₅	Some Medium Sand & Gravel						
					F"]	Encountered at 25'						
					E		L					
8	SS	18"	М	27	E.,							
					E	Medium Dense, Pale Yellow						
				<u> </u>	Ę	(2.5Y 7/4) Fine SAND, Some Silt & Clay (SM)	\perp					
				<u> </u>	35-	Silt a Clay (SA)	-					
-					E		()	Pocke Readi			neter
					Εl		<u> </u>		neau II	19,	J.	
	-			_	F40-	* Shelby Tube Pushed Hydraulically from 3' to 5' at 1000 PSI	-					
					E	ITOM 3 CO 3 &C TOOC F31						4
				-	Εl		-	_				—
	\dashv			-	F-45-			_				····
											·	
	l					(Continued)						

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

Boring No. ELB-82-03
Surface Elevation 910.4
Job No. C 10313
Sheet 2 of 2

. 1409 EMIL STREET • P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (606) 257-4846.

	S	AM	PL	E			so	IL PF	ROP	FRI	TES
		WOLA		ture		VISUAL CLASSIFICATION	-				
No.	Type	ļ	ţ	_	Depth	and Remarks		W	ш	PL	0
					1.1	Medium Dense, Pale Yellow					
9	SS	18"	М	17		(2.5Y 7/4) Fine SAND, Some Silt & Clay (SM)					
				 	-50-	End Boring at 50'	-				
					Ē						
					55-						
					-						
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					- 85-						
			W	AT	ER I	EVEL OBSERVATIONS	GE	NER	AL I	TOV	ES
Up	While Drilling					Craw	/11/82 ChielW	G/S₩	_{نہ} 55	-1	
De	oth to	Wa	ter	_	13.0	DM	DM/	ng Metr W0 10-	50' 10'		
De	Depth to Cave In				1	. , 0-			<i>]</i>		

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

.1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

	S	AN	1PL	E		VISUAL CLASSIFICATION	so	IL PI	ROP	ERT	TIES
	Rec	every	Mei	sture		and Remarks			T.,		
No.	Type	}	+	N	Depth		•	W	ш	PL	0
1	50	27"	M	26	마	FILL: Silty Clay	ļ	<u> </u>	 	-	
	33	27	173	20	ŧ l	12" TOPSOIL	<u>;</u>	<u> </u>	-	 -	├
2	cc	30"	М	6	<u> </u>	Stiff to Very Stiff, Dark Brown (10YR 3/3) Silty CLAY (CL)	(2.2)	<u></u>	†		
	33	30		0	₩5-						
3_	3"ST	9"	M			ST Pushed Hydraulically at 600 PSI Medium Dense, Yellowish Brown	(1.4)	<u></u>			<u> </u>
	↓			ļ		(10YR 5/6) Fine to Coarse SAND			 	<u> </u>	
4	SS	24"	M	15	E10-	& GRAVEL, Some Silt & Clay (SM)			ļ		ļ
					F						
					E						
5	22	18"	ш	39	F	Dense, Light Yellowish Brown			T		
<u> </u>			1	13	E15-1	(2.5Y 6/4) Fine to Coarse					
					<u> </u>	GRAVEL, Little Silt, Some Fine to Coarse Sand, Occasional					
	_	<u> </u>	├	_	£	Cobbles (GW-GM)			-	 	<u> </u>
6	SS	18"	W	34	E20-		 		<u> </u>	<u> </u>	
			}		-						
					E	Maddan Barra I talk W. 11 a tal	7				
7	22	18"	W	20	F	Medium Dense, Light Yellowish Brown (2.5Y 6/4) Silty Fine					
	77		-	-	<u> </u>	SAND, Little to Some Clay (SM)					
					<u>-</u>				1		
	 	_	-	\vdash						-	-
 8.		18"	W	17	- 30-	Medium Dense, Light Olive			-		
					E	Brown (2.5Y 5/4) Fine to					
	<u> </u>				<u> </u>	Medium SAND, Trace Silt (SP)					
					35_						
					F.33						
					E				}	}	
	 -	 	 -	┼	F!				 		
		 	+-	+-	40-					 	-
					E		()		t Pe		mete
	<u> </u>		<u> </u>	ļ	F	Medium Dense, Light Yellowish	┧——	Nead	, ng,	, Jr	
				<u> </u>	45-	Brown (2.5Y 6/4) Silty Fine		<u> </u>	 	 	
						SAND, Little to Some Clay (SM)					
						/Omester of					
	1	i	Į.	1		(Continued)	1			l	

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Boring No. ELB-82-04
Surface Elevation 906.6
Job No. C. 10313
Sheet 2 of 2

. 1409 EMIL STREET • P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (608) 257-4646

	S	AM	IPL	E		VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	IES	
	Rec	very	Mei	store		and Remarks		w	ш	PL	D	
No.	Type	•	•	N	Depth				<u> </u>	r.		
					1	Medium Dense, Light Yellowish Brown (2.5Y 6/4) Silty Fine						
					-	SAND, Little to Some Clay (SM)						
				-	E		-		 			
9	22	17"	W	26	-50-		+					
					E	End Boring at 50'						
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			ļ		E 55-							
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					E							
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	 		<u> </u>		85-	·		NED			EE	
				AI	EK	LEVEL OBSERVATIONS	GENERAL NOTES 2/23/82 2/23/82 Start Complete					
	nile D	_										
	on C ne Aí				rilling ho لا	ur	Crew Chief .L.S. Rig. 55±2 Drilling Method CS 0=10'					
					6.0'	DM	DM/W	0 10-! ") 0-	50'		· · · · · · · · · · · · · · · · · · ·	
Depth to Water				DC (4) O-	10'	. . 					

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

Boring No. ELB-82-Surface Elevation 919.6 Job No. C. 10313 Sheet 1 of 2

. 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

	S	AM	PL	E		VISUAL CLASSIFICATION	SO	L P	ROP	ERT	TES
		very	Moi	sture		and Remarks	9.	w	ш	PL	D
No.	Type	ł	•	N	Depth		1				
1	SS	24"	М	90	Ē	FILL: Silty Fine to Medium Sand, Occasional Gravel					
2	SS	30"	М	4	E,						
3	SS	25"	М	12		FILL: Mixture of Silty Sand, Cinders, Paper, Wood &					
4	SS	30"	M	14	- - 10-	Asphalt Shingles					-
								,			
5_	SS	18"	W	58	-15-	Very Dense, Yellowish Brown (10YR 5/4) Fine to Coarse					
					EE	SAND, Some Silt & Clay, Some Gravel, Occasional Cobbles (SM)					
6	SS	18"	W	24	<u>-</u> 20-	Medium Dense to Dense, Pale					
						Yellow (2.5Y 7/4) Fine SAND, Trace to Little Silt (SP-SM)					ĺ
7	ss	18"	W	32	25-	2" Seam of Coarse Sand & Gravel Encountered at 25'					
											_
8	SS	18"	W	26	<u>-</u> 30-	·		-			
											
					35-						
	_				40						
						•		• •			
 ,					45-						
]		(Continued)					

LOG OF TEST BORING

Project Badger Army Ammunition Plant Surf

Location Baraboo, Wisconsin Sheet

. 1409 EMIL STREET • P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (608) 257-4848...

	S	AM	IPL	E	,	VISUAL CLASSIFICATION	so	IL P	ROP	ERT	IES
	Rec	very	Mei	sture		and Remarks					0
No.	Type	· ·	•	N	Depth				ш	PL	U
						Medium Dense to Dense, Pale					
						Yellow (2.5Y 7/4) Fine SAND, Trace to Little Silt (SP-SM)					
_		3.011	•	1	ĘΙ	(6. 5)	-		 	-	
9	22	18"	W	12	- 50 -		╅				
				į	E	End Boring at 50'					
					上月						
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	WATER LEVEL OBSERVATIONS				LEVEL OBSERVATIONS		NER				
	ile Dr	_					Start	/23/82 Chief	Comi	olete _	23/82
					rilling. % hou	117	Crew	Chief .	R	ig	J-2
	ne Af			9	6.0'		Drilling Method CS 0-10' DM/W0 10-50' DC(4") 0-10'				
-		Cav		-			DC(4") 0-	10"		

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

Boring No. ELB-82-06.

Surface Elevation ... 922.

Job No. C 10313.

Sheet 1 of 2

1409 EMIL STREET • P.O. BOX 9536, MADISON. WIS. 53715 • TEL. (606) 257-4846

	SAN	МF	- L	E		VISUAL CLASSIFICATION	so	IL PE	ROP	ERT	TES
Re	covery	1	Mais			and Remarks	Q.	w	ш	PL	0
No. Typ	e t	\perp	↓	N	Depth				ļ.u.	PL	
1 SS	15	"	М	11		FILL: Fine to Coarse Silty Sand and Gravel					
2 SS	18	+	M	8	E ,						
3 3"5	ST 12	+	М	-		Stiff, Dark Yellowish Brown (10YR 4/4) Silty CLAY (CL)	(1.8				
4 SS	18'	*	M	19	 10 	Medium Dense, Dark Yellowish Brown (10YR 4/4) Fine to Coarse GRAVEL and SAND, Little Silt (GP-GM)					
5 SS	5'		M	14	- - - 15-	-					
		1				Medium Dense to Dense, Light Yellowish Brown (10YR 6/4)					
6 S S	12'	+	M	17	20 -	Fire SAND, Little Silt (SP-SM) Occasional Cobbles Encountered at 16'					
7 SS	17'	1	М	.29		Some Silt & Clay Present at 24'	-	Pocke	Por	0+20	notor
								Readi			ile ce i
8 SS	17'	1	М	25							
		+									
		+			35 						
		1			- - - -						
						·					
	1	+				•					
						(Continued)					

LOG OF TEST BORING

Project Badger Army Ammunition Plant Surf.

Location Baraboo, Wisconsin Shee

Boring No. ELB-82-06
Surface Elevation 922-7.
Job No. C 10313
Sheet 2 of 2

... 1409 EMIL STREET • P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (608) 257-4848-

	S	AM	PL	E	•	VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	IES
	Rece	very	Mois	ture		and Remarks	Qu.	w	ш	PL	D
No.	Type	→	+	N	Depth		T		-	1.	
					ויויו	Medium Dense to Dense, Light Yellowish Brown (10YR 6/4) Fine SAND, Little Silt (SP-SM)					
9	SS	12"	M	30	E ₅₀ _	Trace Silt Present at 49'					
					55 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	End Boring at 50'					
		-			6. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.						
					65-	·					
			-		70-						
					- - - - - - 75-	•					
					بارانايا						
					85-		GENERAL NOTI				
Up Tin De	nile Di on Co ne Af pth to	empi ter C	etion Orillin	NW of (Frilling to hot 13.6	ur	Start Crev Drilli DM/	3/17/8 Chielling Met W0 10- 4") 0-	Com (G/J\$ nod C: 50'	3/1 plete	7/82 -1

FIELD BOR	ING LOG	Boring No. Sur-91
Project No 06353-03 Project Name	BADGER AAP	Page of2
Contractor LAYNE Driller	G RUDRILUEZ Date started 11	-10-91 completed (1-10-9)
Method DVAL WALL Casing Size 9"	O.D. HNU 11.7/10.2 F	rotection Level
Ground EL Soil Drilled /30'	/ 2 below ground //8' T	otal Depth /30'
Logged by PRR Checked by	DRP Date 11/20/91	

.

Sample	Depth in	Blows per	لاشوا	· •	Comments on	Monito	TIG
No	Feet	6 inches	₩ e C	Description	Advance of Boring	HNU	
SE gro	Desth in g. Feet			DEBROWN-RED CLATEY SILT FR F SAND, TR C GRAVEL TR COBBLES COMESIVE	(m)	JAR AIR	
	10-20'			LT BROWN SILTY SAND, WES. F. SOME M., LITTLE C., TR F GRAVEL, TIRACE CLAY PELLETS, CONESIVE	(G)	٥	0
	Zo - 36'			LT BROWN SAMO, WED, M, SOME F, LITTLE SILT LITTLE C, TR GRAV, TR CABBLES	(3)	6	0
	30 - 40	Jo 32	. 32 .40	SAME AS ABOVE CORSILE AND BOULDER ZONE		0	
	40-50	40 42	-50	COBBLE AND BOULDER ZONE LT BROWN SAND, PED M, SOME C, LITTLE F, TR F GRAV, TR C GRAV	(37)	0	0
	50-60			LT BROWN SAND, WED, M-S SOME F GRAV, SOME F SAM TR. COTSBLES	(SO)	O	٥
	60-70	76 72	- 72 - 80	SAME AS ABOVE LT BROWN SAMOY CRAVEL, WGD, GRAV: F, LITTLE, TR COSSES, SAMO: M-C	(W)	0	•
	70 - 80			SAME AS ABOVE	(m)	0	0
	8 -100			SAME AS ABOVE	(w)	0	
	100-106			SAME AS ABOVE			
		101-	106	ORANGE-RED SAND, WED C, SOME M, SOME F GRAV TR COBBLES	(SM)		
Man Man	106-108	7/11/25/40	2/1.5		(<u>3</u>)	0	6

FI	ELD BORING	LOG	Boring No. Eu-91-074
Project No 06853-03	Project Name Barber	R AAP	Page _ 2 ot _ 2
Contractor LAYNE	Ormer & Zoi	WE WOLZ Date started //	-10-91 completed //-/0-91
MESTOS DIAL WALL	Casing Size 9" O.D.	HNU 11.7/10.2 P	Protection Level D
Ground EL	Soil Drilled /30'	4 below ground //8' To	otal Desth /30'
Logged by 18612	Cherked by DRP	Cate 11/20/91	
•			

Sample	Depth in	Blows per 6 inches	Pen	Description	Comments on Advance of Boring		itorno
SPOON # 2	/08-110'	. , , ,	-3%	·	(w)	JARA	IR O
SPOON # ?	110-112	22/33/38/47	2/1.3	LT BROWN GRAVELY SAND, WGD, SAND: M-C, LITTLEF, GRAVEL: F. LITTLE C, TR COSTILLS	(F)		0 0
SPOON #4	/12-114	419/34/36	2/1.4	LT BROWN SAND, WOD, C. SOME M. LITTLE-SOME F GRAV LITTLE F SAMD	(6 6
5/0ev #5				LT BROWN SAND, PED, M. SANE C. TR F GRAVEL	(SB)		9
spou #	115-117	17/50 +0.2'	0.1/	LITTLE F GRAVEL, LITTLE C GRAVEL WITTLE F SAND	W		• 0
SPOON # 7	REFU	SAL AT	- //	6' B6S			·
//5-/ 2 0				LE BROWN SAND AND GRAVEL, C SAND, FGRAVEL WUD	(D) (S) (S)		9 0
/20-/30				17 BROWN GRAVELY SOND WED, M-C. GRAVEL: F. SOME C TS. O. E = 130'	(S)		0

FIELD	BORING	LOG	Boring No. Ew-91-
Project No 06853-03 Project	Name BANGER	AAP	Page _ 1 _ ot _ Z
Contractor LAYNE	Oriller & Ros	RIGHTE Date Started	//- 9 -9/ completed //- 9-9/
Mestod DUAL WAY Casing	Suze 9" O.N	HNU 11.7/10.2	Protection Level \(\sum_{\text{}}
Ground EL Soil Dr	iled /50'	4 below ground/15	Total Depth /50'
Logged by RR Che	oved by DRP	Date 11/11/91	

.

Sample No	Depth in Feet	Blows per 1	Pen Rec	Description	Comments on Advance of Boring	_		rng LEL
5-1	0-10'			D BROWN - RED BROWN CLAYEY SILF, TR F SAND TR M SAND, CONESIVE, MOIST.	MÙ	JAR		0
5-7.	10 - 20'		20	LT BROWN- PED SILTY SAND AND SILT. WED, SAND: F-M, TR CLAY PELLETS, TR -LITTLE CORRECT LT BROWN SIND, WED, M-C, SOME F SAND, TR GRAN			0	o
s-3	20 - Jo'			Bouder And Coßble Bone W/ 1-Brown <u>Sw</u> o WCD, M.C	BIT IS PICKING UP OTEITE BOUDERS AND PUSUING MEM AUGAD BLOCKING THE BIT OPENING		O	
S-4	30-401			SAME AS ABOVE	41		0	0
5-5	40.50'			SAME AS ABOVE	60		9	0
5-6	50 · 60'	50·5	60	SAME AS ABOVE LT BROWN SAND, WUD, M-C SOME F GRAV. LITTLE C GRAV. TR COBBLES	Discober Pock AT 55' SW		0	٥
5-7	60-90'			SAME AS 55-60'	SW	-	0	0
5-8	70- 3 0'		·	LY BROWN SANDY GRAVELY CHANGING INTO GRAVELY SAND, WCD, SAND = M-C TR F SAND, GRAVEL: F, SOME CENTER GRAV, TR COBBLIS				

FI	ELD BORING	LOG	Boring No. EW-91-078
Project No 06853-63	Project Name TANSUE	r AAP	Page or
Contractor LAYNE	Driller & Road	CKUEZ Date started (1-4-91 completed 11-4-91
MEGROO DUAL WALL	Casing Size 9" O.D.	HNU 11.7/10.2	Protection Level D
	Soil Drilled / 50 '		Total Depth /50'
Logged by BRR	Checked by DRT	Date 11/11/91	

Sample	Depth in	Blows per 6 inches	Pen Rec	Description		ents on of Boring		_	orng
S-9	80-90'	80		LT BROWN SAND, WCD, C SOME M, SOME E GRAV, LITTLE C GRAV. GREY-BLACK GRAVEL, PGD, C GRAVEL, SOME F GRAVEL, LITTLE C SAND, LITTLE COBBLES	SW		HN JAR		LEL O
S-10	90-100			GRAVEL AND SANDY GRAVEL AS ABOVE SAND: M-C GRAVELY SAND, WGD, SAND: M-C, LITTLE FSAND GRAVEL: F, SOME C, TR COSTBLES	(G) (J)			0	G
S-11	100-110	/06 ·		IT BROWN SAND, WED, C, SOME M, SOME F GRAV, LITTLE F SAND, TR C GRAVEL, WILD, C GRAVEL, SOME F GRAVEL, SOME C SAND.	(3) (3)			0	q
	10-120		120	LT BROWN SAND WED, C. Some M. LITTEE-SOME F GRAN	(3)	V 115'		0	đ
5-13	/20-130			LT BROWN SANDY GRAVEL, WED. GRAV: F, LITTLE C SAND: M-C, LITTLE F SAND LITTLE SILT	(3)			0	0
	130-140			SAME A: S-12	(w)			0	•
S-15	M0 - 150	·		LT BROWN SAND, WUS, C, SAME M, SOME F GRAV RO.E. = 150' BGS	CHEX !	ROWN CW		•	•

FIELD BORING LOG	Boring No. ELM -9
Project No 06855-03 Project Name BADLER AAP	Page 1 of 3
Contractor LATINE Order & LOOKULE Date started	-13-91 completed $N-17-91$
	Protection Level
Ground El. Soil Drilled 155" 7 below ground 141"	Total Depth /55'
Logged by KRR Checked by DRP Date 11/20/91	

Sample No	Depth in Feet	Blows per 6 incres	Pen Hec	Description	Comments on Advance of Boring			orna
5-1	0-10'	0-	7'	LT BR CLAYEY SILT, UT	MI	JAR	AT	
				F SAND. TR C SAND, COURSIVE. LT BROWN GRAVELY SAND WED, C, SOME M, GRAVEF, TR COBBLES, LITTLE SILT	(3)	0	0	0
S- Z	R-20		-20'	SAME AS 7-10' W/ OCCAISON COTIGLE ZONES AT BROWN SAND, WGD, C, SAME M. LITTLE -SOME FIRAN, LITTLE F SAMO, LITTLE SILT.	SW)	0	0	•
<i>5</i> -3	20-501			SAME AS 15-20' LT BR SAND, PLD, F, LITTLE M. LITTLE-SOME SILT TR C SAND TR GRAV.	@	0	U	3
5-4	30-40			24 A 3 C 4 2 C	SD .	O	5	0
5-5	46 - 50			SAML 45 24-80'	D	0	4	0
5-6	50-60		Į	LITTE SILT, LITTLE CSAND THE GRAV	Ø)	O	•	•
5-7	60-70'			LT BROWN SAND, PLD CMANGING TO WGO W/ DEPTH, M. SOMEC, SOME F. LITTLE F LANVEL, TR C GRAVEL TR SILT AT 70' ENCOUNTER A COBB. ZONE IN A F SANO AND SILT MATRIX	(SP)	0	0	•

	ELD BORING		Boring No. 617-91-10
Project No ₀ 6853-03	Project Name ISADL	ER AAP	Page Z of 3
Contractor LATINE	Onler & Rose	MUE Z Date Started	//-/3-9/ completed //-/3-9/
Mestod MC WALL	Casing Size 9" QD.	HNU 11.7/10.2	Protection Level D
Ground EL	Soil Ornled 155"	2 below ground /4/1'	Total Depth /55
Logged by RICR	Checked by DRP	Date 11/20/91	

Sample No	Depth in	Blows per 6 inches	HeC HeC	Description	Comments on Advance of Boring		_	ornç (¿£'
5-8	70-80	70-74 74-76	ı	COBBLE AND GRAVEL ZONE BROWN GRAVEL, WCD, F	CW	_	ATR	
		76-7	5	Some C, SOME COSSIES LT BROWN SAND, WHD, M, SOME C, SOME FGRAVEL,		0	0	0
		79-x		LITTLE C GRAVEL COBBLE AND BOUDER SANE W) C GRAVEL	GP)			
5-9	50 - 90			LT BROWN-RED SILTY SAND, WGD, F, SOMEM, TR LITTLE F GRAVEL, TR COBBLES	(SW)	0	0	•
S-10	90-100'			LT BROWN GRAVELY SAND, WGD, M-C. LITTLE F. GIZAV:	<i>ઉ</i> એ	0	0	٠
5-11	100-110	/ 00 - / /03-11	و (SAME AS 90-100 17 BROWN SAWD, WUD, C, SOME M, SOME F GRAV, LITTLE C GRAV	SW	0	•	٥
S-/2	110-130			SAME AS ABOVE	€	0	0	0
	130-133			NO SAMPLE TAKEN		-	H	
spoon # 1			1	GENEL TE CAPITAL.	(SP) N:50	0	0	0
stow #2	135-127	7/19/29/40	20/1.7	SAME AS SHOW #1, DAMP	(SP)	•	0	•
spon #3	137-139	3/5/16/29	15	SAME AS SPOON #1	(F)	0	0	G

FIELD	BORING	LOG	Boring No. Elm-9
Project No.06853-03 Proje	et Name BASGI	LR AAP	Page _ 2 _ ot _ 3
Contractor LAYNE	Orster 6 Root	AILUEZ Date started	//-/3-4/ completed //-/3-9/
Mestod DIALLIALL Cook	Size 4" O.D	HNU 11.7/10.2	Protection Level D
Ground EL Soil	Ornied /55'	4 below ground/4/1	Total Depth /55'
Logged by	checked by DRP	Date 11/20/91	

Sample	Destn in	Blows per 6 mones	Pen Rec	Description	Comments on Advance of Boring	_	oniti	orng
SPON #4	139-141	17/21/33/54		-LT BROWN SAND, WGO, C, SOME M, LITTLE C GRAVEL	BUR STURMIN SUOL (SW)	JAR	-	LEL
SPOON ES	141-142.2	9/15/24/35	1.2	AS ABOVE, WET - 141-141.5" 141.5-142.2-LTBN SAND, PEO, C	(50)	0	٥	٥
spoon #6	/43-/44.7	2/6/10/16	2.7/3	LT BR SAND, 160, C	SD	•	•	•
Show #7	145-146.4	4/6/7/12	1.4	SAME AS ABOVE	SP)	0	•	•
spon # &	147-149	34/6/17	2.0	LT BR SAND, POD. M.C.	Ø.	•	0	0
s q a q	149-150.8	5/10/16/23	1.8	FINING DOWNERD. M -> F 0.1' THICK LENS OF SILT AT 150.6'.	SP)	0	0	°
5fbani # 10	157-153	5/16/15/24	2.0	LITTLE M, TRC.	(P)	0	0	0
SPON #11	153-155	5/10/23/44	20/20	ABOVE 15 BROWN	(MY)			

FIELD BORING LO)G	BORING NO. ELM. 89-0ZA
PROJECT NO.: 5753-68	PROJECT NAME: USATHAMA- BAAP	PAGE 1 OF 2
ORILLING CONTRACTOR: LAYNE-N	PATHWEST DRILLER: G. Rodrige	202 DATE STARTED 1/24/89 COMPLETED 1/24/89
HETHOD: Dwal Wall CAS	ING SIZE: 9.0"0.11/6% 60. TIP OV:	0.6 PROTECTION LEVEL:
CROUND ELEV.: NA SC	IL DRILLED: 140' WATER LEVEL: 19	TOTAL DEPTH: 140'
LCGGED BY: 5NW	CHECKED BY:	TE:

Sample No.	DEPTH IN FEST	BLOUS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MCNI	TCR:NG
		0-140163	REC.		ACTANCE OF BEALING	TIP	LEL
5-1	0 - 10'			6-5 - Marifolderse sand Jan w/ little for grave Brow 5-10 Boun Silly fine sand w/ some mod-ing gravel Cubbins	LOWER @ J.		
5-2	10-20'			Brown form sund w to Constant so rounded graph	(3P)		
5-3	20.30			Brown f-m sand w/to 1,the gravel (sm-mea) sub rounded to pounded grading to /w/dept a f-sand w/tr. med sand tr. gravel			
5-4	30.40'			Brown f- C sand of sub x to sub rounded sm to la grave! grave! seam @ 37-39'	BP)		
5.5	40-50			Same as above fining widefth	(SP)		
5-6	D-60			Tan from sand w/ Ar C-sand frog lavel sm row			
5-7	60-70			Same as above Silt long @ ~ 69 - Brown of a prading to a brown f.c Sand w/ little to some qrave)	W &		

FIELD BORING	G LOG	BORING NO. ELM-89-0 ZA			
PROJECT NO.: 5753-	PROJECT NAME: USATHAMA-				
ORILLING CONTRACTOR: L	AYNE-NORTHLEST ORILLER:	r. Radrigo ez 10	ATE STARTED 1/24 COMPLETE	ED 1/24/89	
METHOD: DVA Wal	CASING SIZE: 9'0D /6.25 TZ	7 TIP ev: 10.6	PROTECTION LEVEL:		
GROUND ELEV.: NA	SCIL DRILLED: 146' WA	TER LEVEL: 138	TOTAL DEPTH: MU		
LOGGED BY: GNW	CHECKED BY:	DATE:			

SAMPLE DEPTH IN	1 1	IN BLOWS PER 6-INCHES		DESCRIPTION	COMMENTS ON	MCN (TOR: NG	
₩.	Feet	0-146423	REC.	<u>:</u>	ACVANCE OF SCRING	7:2	! 1.51
5-8	70-80			Brown f-c Sand or / Sub rounded gravel (sm. kg)	(SP)		
-9	80 - 90		14.	Brown f.m Sand w/tr C-Sand. tr Sm. gravel	(5 P)		
-10	90-1001			Same as above little rationum f. San d	(3P)		
;- Il	100-110		1	Gravel (sn-lg) w/cobbles w/little f. c sand grading to a f-c sand + gravel w/dept	103'- GANE! 106' Blow, V Change (GP)		
-12	סמ-שן			Ton, 4t. Brown f. Msand w sme c-sund, little sm-ma gravel	V Change @ (5P)	110	
-13	120 - 130			Same as 5-12	(30)		
-14	130-140			Same as 5-13 increase in gravel co Brown SHy Silfw/fr clay	}		
-15	ופי - סאן			BOB - 140' Stratified	denp (mi)	140	+

FIELD BORING	LOG	BORING NO. ELM-89-03
PROJECT NO.: 5753- 08	PROJECT NAME: USATHAMA- BAAP	PAGE / OF 3
DRILLING CONTRACTOR: LAY	HE-HORTHHEST ORILLER: G. Rodrig	DATE STARTED 1/24/88 COMPLETED 1/25/89
METHOD: Dod Woll	CASING SIZE: 9.00-0/6.60.0 TIP eV:	
GROUND ELEV .: 914-0		134.5' TOTAL DEPTH: 180'
LOGGED BY: SNW		DATE:

SAMPLE NO.	DEPTH IN	BLCWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MCNITCRING	
	1 1661	O-twedes	REC.	DEGGAS-110N	ADVANCE OF GOX, NO	TIP	LEL
5-1	0 - 10'			foldish ten f-sandw/tr.c.sand tr.gravol, moist. tr.s.it poony graded	0-4.0' POP 501L		
5-2	10-20			poorly grained moist (50)			
5-3	20-30'			letten to Brown francisco tris tr m-c saud - darkening w/depte. portygreded. silt content increases w/depte			
5-4	30 - 40			Tau to Botth brown Stratified f-M-c sand r gravel - fine and lenses; well graded 5 to stratum; washed pen grave (98)	@ 30°		
5-5	40-50	Comp	v	Well graded Well graded 43-9 rove / layor 45- grave / the 47- Rounded grave /) Cobbins 5-10 Rounded grave /) Cobbins	Partial loss of Circulation doe to Size of gravely tond penetration		
5-6	50-60'			Brown M-C Soud & Grovel w/ little fine; to 514			
5-1	Go - 76'			Stratified Small Group/ gravel constant increases as/disper			
5-8	70-80			Same as 5 7 gm Gravel increases w/dap	76'-Gravel Strate	,	

.

FIELD BORING	LOG		BORING NO. EU	1-89-03	
PROJECT NO.: 5753-	PROJECT NAME:	USATHAMA- BAAP		PAGE	Z 0 5
DRILLING CONTRACTOR: LAYN	E-NORTHUEST	DRILLER: G. Redru	quez DATE	STARTED //24/89	COMPLETED //25/89
METHOD: Duel Well		0/64"0-0 TIP .		PROTECTION LEVEL:	0
GROUND ELEV .: :914.0	SOIL DRILLED: 18	WATER LEVEL	: 134.5'	TOTAL DEPTH: 180	!
LOGGED BY: SNW	CHECKED BY	7:	DATE:		!

SAMPLE NG.	DEPTH IN	BLOWS PER		NECCTION IN	COMMENTS ON		MONITORING	
	PEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF SCRING	TIP	LEL	
5-9	80-90'			Stratified f-C san + gravel tr. silt, c sand lease at 89-90'	se' Neunge			
-10	90-100			tame as above fining w/depth to to a f-c sand w/sm gravel				
-11	180-110			Same as above process and to process process and the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of the process of th	troid Deagha ha			
-12	110-120			present they braves	vello'			
5-13	120 - 130			Same as about				
-14	130-M			Same as above I 134.0 - apparent after	completion	n		
5-15	140-150		_	Same as afore (5w)	V 150			
	150-160			Gravel Far 159-gand Statum-fm sa W/11	- remaine		4	
				(SP)				

	BORING		BORI	NG NO. ELM. 89	-02
ON TOBLOP			: USATRAMA- BAAP	PAGE	<u>** う</u>
	CHTRACTOR: LAYI		ORILLER: G. Roding DE DATE STARTE		TED //25/
				ROTECTICN LEVEL: D	
		SCIT DEITTED: 16		OTAL DEPTH: 1801	
CGGED BY:	5N.	СЗХГЭНО	DATE:		
	1	1 1			-
sample No.	DEPTH IN	6-INCHES	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MCNITCR:
		RE	COARE		TIP LE
, -11	160-170		Gravel Sm - 19 W/ Sands		
5'''	1,00		f.m sand lenses		
			t-m sake for a	Jante	
			Gravel size increases w/	NOW.	
			rounded to Far	(8)	
			5m-med Gravel tr c. Sa wet		
	170-180		5m-med Gravel tr C.Sa	end l'change	
-10			wet	@120	
1			(4	• 1	
			Bob@ 180		
			Pulped up to 150. to set well		
			Turbon opio ice	•	
			to set well		
			T = 134.5 below G.		
			= 13113 310001	•	
ĺ			1		
				ì	
			į		
			1		
				•	

FIELD BORING	LOG		BORING NO.	ELM -89 -05
PROJECT NO.: 5753-08	PROJECT NAME:	USATHAMA- BAAP	P	PAGE OF
DRILLING CONTRACTOR: LAY	NE-NORTHWEST	DRILLER: G Rodrigo	PATE STARTED 1-31	-89 CCMPLETED Z-(-80
METHOD: Pual Wall	CASING SIZE: 9"			
GROUND ELEV .: 898.2	SOIL DRILLED: 140	' WATER LEVEL: &	TOTAL DEPTH:	140'
LOGGED BY: 77 Brag			TE: 2-1-3 9	
	1			· · · · · · · · · · · · · · · · · · ·

SAMPLE	SAMPLE DEPTH IN BLOWS PER NO. FEET 6-INCHES		PEN.	05552107104	COMMENTS ON ADVANCE OF BORING	MCNITCRING		
	PEE	0-INCRES	REC.	DESCRIPTION	ADVANCE OF BOXING	TIP	LEL	
	0-2			Gravel Fill Fill				
	2-4			DE Brown topsoft (SILT)	Soll)			
	4-35			DK Brown Sand 6 melts				
				GRAVELY SA WI Some				
			<u> </u>	gravely sand (SW)				
	35-73			L+ Brown Line To Med SAND				
				witrace of fine gravel				
				Longers (SP				
	73-98							
	13-40			SL SILTY GRAVELLY SAND				
				200	(3M)			
	98-140	<u> </u> 		gravely SAND W/ som of			ļ	
				Soudy Gravel .				
				generally warser will depth (SW)				
				gept (
				well matalled @ 1331				
				Well matalian 18 133		<u> </u>		
						j		
						ļ		
	1	1	1		I	l .	1	

FIELD BORING LOG			BORING NO. FLM-89-07			
PROJECT NO.: 5753- 08 PROJECT NAM	: USATHAMA- BA	WP		PAGE !	OF Z	
DRILLING CONTRACTOR: LAYNE-NORTHWEST	DRILLER: D	. HARKUS	DATE STARTED U/V89		COMPLETED 4 18 84	
METHOD: G. 25 4 hallowater CASING SIZE: 4.	ZS" ZD.	TIP eV: \$5	PROTECTION	LEVEL: T		
GROUND ELEV .: 913.7 SOIL DRILLED:		R LEVEL: NR	TOTAL DEPT	1: 120		
	BY: 57-2.	4 25 8 DATE:				

Ì	SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MON I	TORING
		7661	O-THURES	REC.		ADVANCE OF BOXING	TIP	LEL
	- 5-1	8'-10'		&ી.	9-12 of by to tan from SAND 150			
	5-2	18-20'			Fi-mes (bended) SAND grading time of ten to reach by to gry to mad by. Bands in i-3 ch in This law.			
	5-3	28 - 28.5		leo] 🛊	f-m in SAND w/ gravel and cookles. Too bbl 300 from 20-36, ported	Spon refundon	_	
	5-4	38-40		اگرا.	find the SAND of graved (SP)		—	
1	55	48-50'		757.	f.m It be SAND w/sm gravitant to cubbles	Spon refused @18"	-	
	5-6	58'-60'		557	from It by gravelly sound wo to copple.	Stoon Inform (012" (D=441)	-	
	5-7	68'-70'		7ብ.	for It be goodly 5000 u/to cobblish grating to one ten goverly 5000. (3) Cupper porting somple probably cours).	P)	-	
	S 8	78-%'		2કી.		(5pm M/m)@6") —	
	S -9	88-9°		207	H by fin gravelly SAND (50)	(du don 66.)	_	
	S-10	98-100!		25].	It by to tan med growlly SAND (SP)		_	
	5.11	108'-110'		25].	it br f-m gravelly SAND #		~	
	S12	118-120	No.	10%	Hbr m grandly SAND (3P)			
			- -		Abandaced Baring Die 13 Capples & Broxen HSA @ 20'			

Born coupleted By AP-1000 & Dim ware Driving wethods.

1.:4

FIELD BORING	LOG			BORING N	O. EL	M-89-07
PROJECT NO.: 5753-08	PROJECT NAME:	USATHAMA-	BAAP			2 of 2
DRILLING CONTRACTOR: LAYN	E-HCRTHNEST	DRILLER: G	Rodrinuez	DATE STARTED 4/	7/89	COMPLETED 4/18/8
METHOD: AP-1000			TIP ev: .		H LEVEL: I	
GROUND ELEV .: 913.7	SOIL DRILLED: 170) WAT	TER LEVEL: 140'	TOTAL DEP	TH: 170'	
LOGGED BY: BUSS	CHECKED BY	· gof	PES SI DATE:			

SAMPLE NO.	DEPTH IN	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONI	TORING
		• inches	REC.			TIP	LEL
Sex	0>10		55	or detailed Soil description see by Som prepared Bushes 15A initially drilled well.			
			wt	own Sine-Med SAND I numerous cobbles + wilders, Some silf+ ine Sand. &P)			
			v	ery hard driving on cap. oulders at 120-12051.	11PBKgd=	p-a	5
5#3	120-130		1 +1	y, v. hard gravel, cobble boulder. Much dust in ex	done	0.2	
5# 14	130-140		ha	rough boulders. rough boulders. rd am-gravel, colbles+ ulders. Hoist		0.1	
15	140-150		M. So	nd and gravel some 134; ed - Fine GRAVEL wt me Croe Gravel - Cobo	Ves W	0.3	
54/6	J		Cr.	Le med-crose Sound le se-Med SAND wtown avel. accomples + bould se Sine SAND	ers	0.9	
9417			Sn-	med Sand with Crose Sund Cob whiters.	bles	0.5	+ (

FIELD BORING	ELD BORING LOG T NO.: 5753-05 PROJECT NAME: USATHAMA- BAAP				BORING NO. EM-89.08			
PROJECT NO.: 5753-08	PROJECT NAME:	USATHAMA- 8	IAAP	Ta., T		-	PAGE	OF I
RILLING CONTRACTOR: LAYNE-NORTHHEST DRILLER: D. MARKY			. MARKUS		DATE STA	RTED 3/30		COMPLETED 4 189
METHOD: 6.26 A AUSER	CASING SIZE: 6.2	S"I.D.	TIP eV:	# 5		PROTECTION	LEVEL: D	
GROUND ELEV.: 903.0	SOIL DRILLED: 14	9 WAT	ER LEVEL:	131		TOTAL DEPT	H: 149'	
LOGGED BY: TEIP AUEN	CHECKED BY	96		DATE: 4	10/89			

SAMPLE NO.	DEPTH IN FEET	SLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MON I.	TORING
	7661	O-INCHES	REC.			TIP	LEL
5-1	6 -10		24/3	fin Sano w/grand and cabbles - very bony, had drilling.	(0-2 = bear clk by to be much size w/organic) 0-2' 72		
5-2	20-22		24/24		2-20'	_	
5.3	28.3º		100%	Nes It by sano w/to out, own good and conster		_	
5.4	38-40		اعناً	Sinder to 5.3 (5P)	Som white		
5.5	48.50		501	of frield grano/cherit	Sum refraction apparent collection		
5-6	58-60			Mes of br to tan Swid w/on grand	Spen refused on	-	
5-7	68-70			Mo! It ist to ta SAND w/ Am pound	South K) OG,	_	
58	78-80	·	8% જી	Towned SAND with some ground. Lt town SAND (SP)		-	
5-9	\$8.90	·		It british now Sens w/ to gravel		_	
5-10	98-100 . 103-106		10.0	Crposan		_	
5-11	108-110		10%	Utbr med to come staro of grand		_	
5-12	118-120		25%	and Cobboles growthy It by mal to Coarse (SANO) whome Cobboles (SANO)		1	
	(الريخة	rples bile	J 12	o') \(\subsection \)	•		
B04	149						
		_			•		
		•					

10:3

BORING NO. ELM-8409 FIELD BORING LOG PROJECT NO.: 5753- DE PROJECT NAME: USATNAMA- BAAP 1 0 2 PAGZ COMPLETED 4/13/89 ORILLING CONTRACTOR: LAYNE-HORTHWEST DANIELS M. DANIELS DATE STARTED 4/10/89 METHOD: HSA CASING SIZE: 4.25"ID TIP ev: 10-6 PROTECTICH LEVEL: D TOTAL DEPTH: 160 GROUND ELEV .: 919.6 |SOIL DRILLED: 160 WATER LEVEL: 140 LCCCED BY: BCM CHECKED BY: DATE:

Sample No.	DEPTH IN FEET	SLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF SCRING	MON17	CRING
			REC.	i		TIP	LEL
5-1 5-2	0-2	From Curriners Pushed	1.5,	DARK OLIVE TO DARK BROWN CLAYEY SILT MEDIUM PLASTICITY, MOIST, ORGANIC MATERIAL PRESENT ML BROWN	Cobbles Stretile @ 3'	00	
	10012	FUSHEU		F-C SAND, NEW CORDERS F-C SANS, 20-30% SANG F-C SAN, TRACE SI, PRY, NEW DOUSE SW	Cosbles	0.0	
5- 3	20-22	Pushers	19/10	the sand, 20-30% sand f-c	venerge 21'	6.0	
s- †	30-32	POSHED	1.99	BROWN SAND, WERD F-M, LI, SANG F-C SAND, DAMP, MOD DEUSE SU	v charge e	0.0	
\$-5	40-42	PusifeD	27/20	TAN SAND, PGFD, VF TO M SA W A 0.4' BLINE SI LAMER, MOD PLASTIC, M 40.6', DRT, LOOSE SP	change @40'	0.0	
S-6	50-52	Royen	19/10	SO-SO.5 TAN, PERO, F-M SA, LOOSE, DAMP SO.5-51 BROWN GRAVELUT SAND, PERO F-M, 20-30% SPD CERN, 1700, DENSE, DAMP SP (SHAPP CONTACT @ 50.5')		ao	

47

FIELD BORING	LOG			BORING NO. ELM- 8909			
PROJECT NO.: 5753-08	PROJECT NAME:	USATHAMA- BAAP		PAGE	2 of 2		
ORILLING CONTRACTOR: LAYNE-NORTHWEST DRILLER: M. DANIELS DATE STARTED 4/10/89 COMPLETED 4/13/8				COMPLETED 4/13/85			
METHOD: HSA	CASING SIZE: 6.25		: 10.6	PROTECTION LEVEL:	D		
GROUND ELEV .: 919.6	SCIL DRILLED: 160	WATER LEVEL:	140	TOTAL DETTH: 160			
LCGGED BY: BCM	CHECKED BY	:	DATE:				

SAMPLE NO.	GEPTH IN FEET	BLCWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONITOR: Y	
	F55;	G-TWFTE2	REC.	DE30015/110M	AUTHREE OF BURING	TIP	LEL
5- 7	60-62	Position	0.5	BEOWN SAND, P GRD, F-M, tr C, GO F-C GEV, LOOSE, DAMP 59		00	
5-B	70-72	Pusiten	0.6,		LOBBLES VCHRINGE @ 70'	0	
5- 9	80-82	Pusht CNS	0.5	HOD DOUSE, DAMP SW BEOWN BAND, PERD, FTU M, LI C SA TO CERV, MOD	COBBLES	.0	
S טר	90-92	Pusito	0.5	Douse, Dang Sp			
5- 11	100-102			ALL CANE, NOT SAMPLED			
5-12	110-112	Pusaco		BOOWN SOND, PGRD, F-M, TE CSA - F GEV, DAMP SP		0	
5-13	120-122	PuoHED		AS AMOVE W/ LITTLE C SA - F GRV, DAMP 3P		0	
5-14	190-132	Pusheo		Beauty SANO, PERO, F-M		0	
	<u> </u>			34, TR C 54 - F GeV, DAMP 59 BOB @ 160			

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Boring No. ELN-82-Surface Elevation 902.8
Job No. C 10313
Sheet 1 of 3

1409 EMIL STREET • P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (608) 257-4848.

	S	AM	PL	Œ		VISUAL CLASSIFICATION	SOIL PROPERTI			ries	
	Rece	very	Meisture			and Remarks					
No.	Type	1	↓	N	Depth		•	W	u	PL	D
				1	E	12" Silt, Sand & Gravel (Toe of Hill) Medium to Stiff, Dark Brown				ļ	
1	SS	18"	М	6	£	(10YR 3/3) Silty CLAY (CL)	(1.0)				-
2	3"ST	13"	м	-	X.	Shelby Tube Pushed Hydraulically from 3-5' at 900 PSI	(1.5)				
3	SS	12"	M	30	F	Medium Dense to Dense, Yellowish					
4	SS	18"	М	18	- - - - - - -	Brown (10YR 5/6) Fine to Coarse					
5	SS	12"	M	32	15 15	More Gravel Encountered at 10%					
6	SS	12"	M	18	11111111111111111111111111111111111111	Medium Dense to Dense, Light Olive Brown (2.5Y 5/6) Fine to Medium SAND, Some Silt	()	Pocke Readi		netro TSF	meter
7	SS	6"	M	31	1 25 -	& Clay, Little Gravel (SM) Lacking Gravel at 25'					
8	SS	7"	М	25	<u>, יייין יין ין</u>	Boring Completed to 30' on 3/17/82					
·					لهلمليل						
					45-						
						(Continued)					

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LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo Wisconsin

Boring No. ELN-82-01A
Surface Elevation 902.8
Job No. C 10313
Sheet 2 of 3

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

Recovery Moisture and Remarks Ne. Type + N Depth Boring Completed from 30' - 132' on 3/29/82 Unit: SAMS-2 Chief: Tom 0.		S	ΑM	IPI	-E	.	VISUAL CLASSIFICATION	SOIL PROPERT			ERT	TES
Boring Completed from 30' - 132' on 3/29/82 Unit: SAMS-2 Chief: Tom 0. Very Dense, Light Yellowish Brown (10YR 6/4) Fine to Coarse SAND, Some Silt & Clay, Some Gravel, Occasional Cobbles (SM) 200 Gallons of Mud Loss at 60' Very Dense, Pale Brown (10YR 6/3) Fine to Coarse SAND, Some Gravel, Little Silt (SP-SM) 2" Clayey Sand Seam Encountered at 79'	 _, , ,			and Remarks	Qu	w	u	PL	D			
9 SS 18" M 53 - 55 Coarse SAND, Some Silt & Clay, Some Gravel, Occasional Cobbles (SM) 200 Gallons of Mud Loss at 60' Very Dense, Pale Brown (10YR 6/3) Fine to Coarse SAND, Some Gravel, Little Silt (SP-SM) 2" Clayey Sand Seam Encountered at 79'							on 3/29/82 Unit: SAMS-2			-		
200 Gallons of Mud Loss at 60' 70 75 10 SS 12' M 188 80 Fine to Coarse SAND, Some Gravel, Little Silt (SP-SM) 2" Clayey Sand Seam Encountered at 79'	9	SS	18"	М	5:	+++++	Brown (10YR 6/4) Fine to Coarse SAND, Some Silt & Clay, Some Gravel, Occasional					
Very Dense, Pale Brown (10YR 6/3) Fine to Coarse SAND, Some Gravel, Little Silt (SP-SM) 2" Clayey Sand Seam Encountered at 79'												
Very Dense, Pale Brown (10YR 6/3) Fine to Coarse SAND, Some Gravel, Little Silt (SP-SM) 2" Clayey Sand Seam Encountered at 79'												
10 SS 12" M 188-80 Fine to Coarse SAND, Some Gravel, Little Silt (SP-SM) 2" Clayey Sand Seam Encountered at 79'							Very Dense, Pale Brown (10YR 6/3)					
	10	SS	12'	<u>M</u>	18	<u> </u> 	Fine to Coarse SAND, Some Gravel, Little Silt (SP-SM)					
							(Continued)			[[[



WARZYN | LOG OF TEST BORING

Project .	Badger Army	Ammunition	Plant
Location		Wisconsin	***************************************

Boring No. ELN-82-01
Surface Elevation 902
Job No
Sheet 3 of 3

_1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848-

	SAMPLE					VISUAL CLASSIFICATION	SOIL PROPERTIES							
No:	Recovery Moisture Type V N Depth				Denth	and Remarks	Q.	w	LL	PL	D			
11	SS	18'	M	777	100	Very Dense, Pale Brown (10YR 6/3) Fine SAND, Little Silt and Clay (SP-SM)								
MATE Wh Upo Tim	HE U	VFI, illing imple ter C	ORSI ————————————————————————————————————	of C	120 125 130 TIONS 26.0'	r	Star	ENER t 3/15/v Chiefing Met 10-30	182 _{om}	plete	/29/82 5-			

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Boring No. ELN-82-01B
Surface Elevation 902.4
Job No. C 10313
Sheet 1 of 1

_1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848 🕳

	S	AM	PL	E		VISUAL CLASSIFICATION	so	IL PF	₹OP	ERT	IES
	Reco	very	Mois	ture		and Remarks	Qu	w	u	PL	0
No.	Type	+	+	N	Depth		<u> </u>			"	
					بليليا						
						Note: For more detailed subsurface information, refer to Log of Test Boring No. ELN-82-01A					
					40-						
					المليليا	Drilling proceeded hard from 60' to 70'. No mud loss during drilling operation					<u></u>
					الملطا						
		·			- 80 - - -						
					المامليا						
					120						
										٠	
-					: - - -	End Boring at 143.5'	•				
					- - - - - - - - - - - - - - - - - - -						
	··		W	AT	ER	LEVEL OBSERVATIONS		NER			
Up:	ne Af	mple ter C	etion Orillin		Drilling		Crev	3/30/8 v Chief ng Met	om Op	Ria S	AMS-2
	oth to oth to			-				· · · · · · · · · · · · · · · · · · ·	••••••		··········



LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

Boring N	o ELN-82-01C
	Elevation
Job No.	C 10313
Sheet	of

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			IPL			VISUAL CLASSIFICATION	SOIL PROPERTIES						
			Mois		Ţ . —— -	and Remarks		w	LL	PL	ι		
No.	Type	+	•	N	Depth		-		-		_	-	
					F-								
	-				<u> </u>								
	 					Note: For more detailed subsurface						. .	
ļ					E	information, refer to Log of Test Boring No. ELN-82-01A	}						
					E	5		 			<u> </u>	_	
					E 40			-					
I										'			
	-				E			<u> </u>					
	 				<u> </u>						·		
Ì					E								
	 				E	No mud loss observed during		-				_	
—	┝╾╺┝				E 80	drilling operation	 						
i					E								
	 				E						 -		
	╁╼┽				E 4								
Ì					E								
					E								
					120			<u> </u>					
ļ					F								
	 				<u> </u>								
-					F -		.						
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	 		-		E l	End Boring at 153.5'	_						
	<u></u>			 	F-1604		<u></u>	NED	<u></u>		.E.C	_	
	WATER LEVEL OBSERVATIONS							NER. 3/29/8			<u>ES</u> /29/8	-	
While Drilling								t "	.Com	plete' !ia S/			
									Chiefom ORig SAMS-2				
	oth to	_		-			1					ļ	
Dei	oth to	Cav	/e in	_								, <i>I</i>	

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

≟1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. ≒3715 • TEL. (608) 257-4846 ±

	S	AM	PL	E	•	VISUAL CLASSIFICATION	SOIL PROPERTIE				
		very	Moi	sture		and Remarks	G.,	w	LL	PL	D
No.	Type	+	•	N	Depth		 `		-		
7	SS	18"	М	4	E	Stiff to Very Stiff, Very Dark Grayish Brown (10YR 3/2)	(1.0)				
2	B"ST	19"	M	+-	X	Silty CLAY (CL)	(1.6)		 		
					<u> </u>	Shelby Tube Hydraulically Pushed from 3-5'			-		
3	SS	18"	M		F	110m 3-5			<u> </u>		
4	SS	12"	М	45	10-		1-	<u> </u>			<u> </u>
	}				E	Medium Dense to Dense, Light Olive Brown (2.5Y 5/4) Fine					
5	SS	12"	М	25	F.,	to Coarse SAND and GRAVEL, Little Silt, Occasional					
					— 15- —	Cobbles (SP-SM)					
					F		_				ļ
6	SS	12"	М	46	<u>-</u> 20-			Daalaa	D = -		-
						Dense to Very Dense, Dark Yellowish Brown (10YR 4/4)		Pocke Readi	ng, T	SF	leter
7	SS	12"	М	38	E ₂₅ -	Fine to Coarse GRAVEL, Some Fine to Coarse Sand, Some					
					E	Silt & Clay (GM)			}		
_				-	E.	·					<u></u>
8	SS	7"	M	108	30-	Boring Completed to 30' on 3/18/82					
					E						
					35-						
					E						
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	-			 	<u>-</u> 40-						
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					- - - - - - -						
1.						(Continued)					



LOG OF TEST BORING

Project	Badger Army Ammunition Plant
Location	Baraboo, Wisconsin

ELN-82-0
Surface Elevation912.1
Job No C. 10313.
Sheet 2 of 4

__1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848_

	SAMPLE Recovery Moisture			E		VISUAL CLASSIFICATION		SOIL PROPERTIES							
		ery	Mois		T	and Remarks	qu	w	LL	PL	D				
No. Typ	pe	•		N N	Depth	Boring Completed from 30' - 130' on 3/31/82 Unit: SAMS-2 Chief: Tom 0.									
9 \$	SS 1	18"	M	41	- - - - - - - - - - - - - - - - - - -	Dense, Very Pale Brown (10YR 7/4) Fine SAND, Trace Silt (SP)									
		•	-		65-										
10 SS	S	18"	Н	45	75-	Dense, Yellowish Brown (10YR 5/4) Fine to Coarse GRAVEL & SAND, Little Silt, Occasional Cobbles (GP-GM)									
					85- - - - - - - - - - - - - - - - - - -	(Continued)									

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LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

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	s	AM	PL	E		VISUAL CLASSIFICATION	so	L PF	ROP	ERT	IES
		very	Mois			and Remarks	Qu	W	LL	PL	D
No.	Туре	+	+	N	Depth						
11		18"		110	100 105 110- 115- 125-	Very Dense, Light Yellowish Brown (10YR 6/4) Fine to Coarse SAND, Little Gravel, Trace Silt (SP) Boring Completed from 130' - 142' on 4/1/82					
						Unit: SAMS-2 Chief: Tom O.					
					35	<u> </u>					
						(Continued)					4



LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Boring No. ELN-82-02A Surface Elevation 912. Job No. C 10313 Sheet 4 of 4

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

	S	AM	PL	E		VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	TES
		overy	Mois			and Remarks	Qu	W	LL	PŁ	
No.	Type	+	+	N	Depth						
					140	Dense, Light Yellowish Brown (10YR 6/4) Fine to Medium SAND, Trace Silt (SP)					
12	SS	18"	Н	37	E '						
	 .				145	End Boring at 142'					
					-1-1-1-150-						
	- -				1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.						
					160	·					
					- - - - - - - - - - - - - - - - - - -			-			
					- - - 170						
					-175-						
<u> </u>			W	'AT	ER	LEVEL OBSERVATIONS	I——	NER			
Upo Tim Dep	on Co le Af oth to	rilling omple ter D o Wa o Cav	etion Filling ter		Prilling	<u>ur</u>	Crev Drilli FA	3/18/8 v Chief ^l ng Met ng 30 /W0 30	HG/JS hod	ia 5	4/1/82 5-1 -10

LOG OF TEST BORING

LOG OF TEST BORING	Boring No. ELN-82-028
Project Badger Army Ammunition Plant	Surface Elevation914.6.
Project Badger Army Ammunition Plant Location Baraboo Wisconsin	Job NoC. 10313 Sheet 1 of 1

	S	AM	IPL	E.		VISU	AL CLASSIFICATION	so	IL P	ROP	ERT	IES
	Reco	very	Moi	sture			and Remarks	ą.	w	l LL	PL	D
0,	Type	+	+	N	Depth	 		ļ.,				
			'		Ē-							
					E							
•		•			-	Note:						
					ET		information, refer to Log of Test Boring No. ELN-82-02A					
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					F- L							
_				 -	E		End Boring at 151.5'			 		
				<u> </u>	760-							
			W	AT	ER L	EVEL OF	BSERVATIONS		NER			
/h	ile Dr	illing						Star	4/1/82	. Cor	4 plete	/1/8
					Drilling			Crev	v Chief	Om O	RigS/	AMS-
	e Af	ter C Wa		9 -				Drilli	ng Mel	thod i	-ט ויוע	121.

ENGINEERING INC

LOG OF TEST BORING

Badger Army Ammunition Plant
Project

Location Baraboo, Wisconsin

. 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4846...

	SAMPLE Recovery Moisture					VISUAL CLASSIFICATION		SOIL PROPERTIE					
	Reco	very	Mois	ture		and Remarks	Qu	w	ш	PL	n		
e. T	ype	+	+	N	Depth				LL.				
	Ì				F				!				
}					Εl								
1					FI								
T					E 1	Note: For more detailed subsurface							
					F	information, refer to Log of Test Boring No. ELN-82-02A							
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LOG OF TEST BORING

Project Badger Army Ammunition Plant Surfa

Job N

Location Baraboo, Wisconsin Sheet

. 1409 EMIL STREET • P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (608) 257-4848.—

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No. Type	D	- W (1 B)					ture	Mois	very	Rece		
1 SS 29" M 13 Silty CLAY, Little Fine Sand (CL) 2.33 42.2 19.1					T		Depth	N	+	+	Type	No.
2 3"ST 18" M - 3 3 SS 27" M 25 4 SS 24" M 44 10- 5 SS 18" W 87 15- 6 SS 18" W 18 29- 7 SS 18" W 16 25- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39- 8 SS 18" W 28 39-					12 2	Very Stiff, Dark Brown (10YR 3/3)	╞ ╽	10		2011	-	
3 SS 27" M 25 4 SS 24" M 44 5 SS 18" W 87 7 SS 18" W 16 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 18" W 28 8 SS 1					12.34	Silty CLAY, Little Fine Sand (CL)	Da l	13	M	29"	33	
Light Olive Brown (2.5Y 5/4) Fine to Coarse SAND and GRAVEL, Little Silt & Clay SP-SM) Light Olive Brown (2.5Y 5/4) Fine to Coarse SAND and GRAVEL, Little Silt & Clay SP-SM) Medium Dense, Yellowish Brown (10YR 5/6) Fine SAND, Trace to Little Silt (SP-SM) Medium Dense, Pale Yellow (2.5Y 7/4) Fine to Medium SAND, Some Silt & Clay, Trace Gravel (SM) Boring Completed to 30' on 2/24/82 * Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI * Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI		19.1	42.2				 	_	М	18"	3"ST	2
Light Olive Brown (2.5Y 5/4) Fine to Coarse SAND and GRAVEL, Little Silt & Clay SP-SM) Light Olive Brown (2.5Y 5/4) Fine to Coarse SAND and GRAVEL, Little Silt & Clay SP-SM) Medium Dense, Yellowish Brown (10YR 5/6) Fine SAND, Trace to Little Silt (SP-SM) Medium Dense, Pale Yellow (2.5Y 7/4) Fine to Medium SAND, Some Silt & Clay, Trace Gravel (SM) Boring Completed to 30' on 2/24/82 * Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI * Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI						Ma Itana Bassa da Nassa Banas	Ēl	25		27"	22	2
GRAVEL, Little Silt & Clay GRAVEL, Little Silt & Clay SP-SM GRAVEL, Little Silt & Clay SP-SM Medium Dense, Yellowish Brown (10YR 5/6) Fine SAND, Trace to Little Silt (SP-SM) Medium Dense, Pale Yellow (2.5Y 7/4) Fine to Medium SAND, Some Silt & Clay, Trace Gravel (SM) Boring Completed to 30' on 2/24/82 * Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI * Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI						Light Olive Brown (2.5Y 5/4)		25			33	
SS 18" W 87 15 Medium Dense, Yellowish Brown (10YR 5/6) Fine SAND, Trace to Little Silt (SP-SM)		ļ			-		E10-	44	М	24"	SS	4
6 SS 18" W 18 - 20 - Medium Dense, Yellowish Brown (10YR 5/6) Fine SAND, Trace to Little Silt (SP-SM) 7 SS 18" W 16 - 25 - Medium Dense, Pale Yellow (2.5Y 7/4) Fine to Medium SAND, Some Silt & Clay, Trace Gravel (SM) 8 SS 18" W 28 - 30 - C C C C C C C C C C C C C C C C C C							E					
6 SS 18" W 18 - 20 - Medium Dense, Yellowish Brown (10YR 5/6) Fine SAND, Trace to Little Silt (SP-SM) 7 SS 18" W 16 - 25 - Medium Dense, Pale Yellow (2.5Y 7/4) Fine to Medium SAND, Some Silt & Clay, Trace Gravel (SM) 8 SS 18" W 28 - 30 - C C C C C C C C C C C C C C C C C C							£ !					
Brown (10YR 5/6) Fine SAND, Trace to Little Silt (SP-SM) 7 SS 18" W 16 - 25 Medium Dense, Pale Yellow (2.5Y 7/4) Fine to Medium SAND, Some Silt & Clay, Trace Gravel (SM) Boring Completed to 30' on 2/24/82 * Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI * Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI					+-		<u>-</u> 15-	87	W	18"	SS	_5_
Brown (10YR 5/6) Fine SAND, Trace to Little Silt (SP-SM) 7 SS 18" W 16 - 25 Medium Dense, Pale Yellow (2.5Y 7/4) Fine to Medium SAND, Some Silt & Clay, Trace Gravel (SM) Boring Completed to 30' on 2/24/82 * Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI * Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI							E					
Brown (10YR 5/6) Fine SAND, Trace to Little Silt (SP-SM) 7 SS 18" W 16 - 25 Medium Dense, Pale Yellow (2.5Y 7/4) Fine to Medium SAND, Some Silt & Clay, Trace Gravel (SM) Boring Completed to 30' on 2/24/82 * Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI * Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI					╄			-				
Trace to Little Silt (SP-SM) 7 SS 18" W 16 - 25 Medium Dense, Pale Yellow (2.5Y 7/4) Fine to Medium SAND, Some Silt & Clay, Trace Gravel (SM) 8 SS 18" W 28 - 39 - 6							20-	18	W	18"	SS	6
Medium Dense, Pale Yellow (2.5Y 7/4) Fine to Medium SAND, Some Silt & Clay, Trace Gravel (SM) () Pocket Penetro Reading, TSF * Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI						Trace to Little Silt (SP-SM)	F					
Medium Dense, Pale Yellow (2.5Y 7/4) Fine to Medium SAND, Some Silt & Clay, Trace Gravel (SM) Boring Completed to 30' on 2/24/82 * Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI ** Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI							E	16	1.1	1.0#		
(2.5Y 7/4) Fine to Medium SAND, Some Silt & Clay, Trace Gravel (SM) (1) Pocket Penetro Reading, TSF * Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI							E 25-	10	W	18"	33	
SAND, Some Silt & Clay, Trace Gravel (SM) Some Silt & Clay, Trace Gravel (SM) () Pocket Penetro Reading, TSF * Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI						Medium Dense, Pale Yellow (2.5Y 7/4) Fine to Medium	Ē					
Boring Completed to 30' on 2/24/82 * Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI						SAND. Some Silt & Clay. Trace	F.,	28	W	18"	55	8
* Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI	neter					- draver (3M)	E.					
* Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI		SF	ng, T	Readi		Boring Completed to 30' on 2/24/82	E					
* Shelby Tube Pushed Hydraulically from 2.5' to 4.5' at 600 PSI			ļ		-		E35-					
						* Shelby Tube Pushed Hydraulically	Ē					
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LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

Boring No. ELN-82
Surface Elevation 925.2
Job No. C 10313
Sheet of 4

... 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

	S	AM	IPL	E	ļ	VISUAL CLASSIFICATION	SOIL PROPERTIE						
	Reco	very	Mai	sture		and Remarks	Qu	w ·	LL	PL	D		
No.	Type	+	•	N	Depth		"	7	LL	PL.	ט		
	-			\vdash	-	Boring Completed from 30' - 155'	-						
				\vdash		from 3/23/82 to 3/24/82	\vdash						
_					50-	Unit: SAMS-1							
_	_				E	Chief: Larry F.							
				-	ŧΙ								
9	SS	18"	M	9) - 55-	Very Dense, Pale Yellow (2.5Y 7/4) Fine to Medium SAND, Little Gravel,							
						Little Silt (SP-SM)							
				\vdash	F			<u> </u>					
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0	SS	5"		200	£	Very Dense, Pale Yellow (2.5Y 7/4)							
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					E								
			-	-	Ę l	Hit a Cobble or Boulder after 6" of Driving at 79'							
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LOG OF TEST BORING

Project Badger Army Ammunition Plant

Boring No. ELN-82-03A
Surface Elevation 925.2
Job No. C 10313
Sheet 3 of 4

.1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

Ne.	SAMPLE Recevery Meisture					VISUAL CLASSIFICATION		SOIL PROPER			TIES		
1440		Very	Meis	ture	Depth	and Remarks	q .	W	ш	PL	D		
	SS	14"	M			Very Dense, Light Yellowish Brown (10YR 6/4) Fine to Medium SAND, Some Silt & Clay, Little Gravel (SM)							
12	SS	14"	М	147	7-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	Very Dense, Very Pale Yellow (10YR 7/4) Fine to Medium SAND, Little Gravel, Trace Silt (SP)		·					

LOG OF TEST BORING

Badger Army Ammunition Plant

Location Baraboo, Wisconsin

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	S	AN	IPL	E		VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	IES
41-		very	Moi:	sture	T	and Remarks	Qu	w	LL	PL	D
Ne.	Type	18"	<u>н</u>	258	Depth 146			W	ıı	PL	0
					160-						
Upo Tirr Dec	ile Dri	mple er D Wal	etion rilling	of D	FINING HOU	LEVEL OBSERVATIONS	Start Crew Drillin	NER/ 2/24/82 Chief ! 10-1!	Comp S R	3/2	24/82 5-2

LUG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

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SAN	1PL	E		VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	IES
Recovery No. Type	Mois		Depth	and Remarks	4.	w	LL	PL	0
				NOTE: For more detailed subsurface information, refer to Log of Test Boring No. ELN-82-03A					
			ւլույրորորդորդորդույր Տ						
				Drilling from 90' -166'performed on 3/25/82					
			ւրյուրդորոր	End Boring at 166 \					
While Orilling		/AT	200- ER	LEVEL OBSERVATIONS	Star	NER 3/24/8	2 Com	pletě	/25/8

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Boring N	ELN-	82-03	
Surface	Elevatio	n 94	
Job No	C 10	313	
Sheet	1		<u> </u>

...1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

SAMPLE						VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	IES
Recevery Moisture No. Type + N Depth			ture		and Remarks	Qu.	w	ш	PL	ם	
No.	Type	· ·	+	N	Depth		"	"		'.	
		بإبطهاباليا						-			
					1-1-1-50 1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	NOTE: For more detailed subsurface information, refer to Log of Test					
					اماملماملياما	Boring No. ELN-82-03A					
					11111111111111111111111111111111111111						
					գ 1 1 1 1 1 1	Drilling from 100' - 176' performed on 3/24/82 Drilling proceeded hard a 110'			•		
					֓֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֝֓֓֓֓֓֓	Based on Cuttings Obtained by Driller, Well Installed in: Fine to Coarse SAND, Little Silt					
					.	End Boring at 176'					
		·	W	ΆΤ	ER	LEVEL OBSERVATIONS	GENERAL NOTES				
While Drilling							Start Complete Crew Chief TO Rig SAMP Drilling Method DM 0				24/8

LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

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	S	AM	PL	E		VIOLIAL OLACOITICATIONI	so	IL P	ROP	ERT	TES
Recovery Meisture No. Type + N Depth			ture		VISUAL CLASSIFICATION and Remarks		w	ш	PL	D	
No. Type 🕇		•	+ N		Depth					7.	
				-	두	16" TOPSOIL		 	┼	-	
Н_	SS	<u> 18'</u>	M	8		Stiff, Brown to Dark Brown	(1.7	 	 	-	
2	3"ST	14"	M	-	X .	(10YR 4/3) Silty CLAY, Trace of Fine Sand (CL)	(1.5)	42.9	22.5	
3	SS	18"	М	5	* **		(1.0				
4	SS	14"	М	16		Medium Dense to Very Dense, Light Yellowish Brown (2.5Y 6/4) Fine to Coarse SAND and GRAVEL, Some Silt & Clay (SM)					
5	SS	7"	M	74	15- 15-	Encountered at 3' Seam of Very Fine to Fine Sand at 15'					
_6	SS	17"	M	42		Less Silt, But More Gravel					· · · · · · · · · · · · · · · · · · ·
7	SS	12"	<u>M</u> _	44		Encountered from 18' to 25'					
8	SS	7"	M	36	- - - - - - - -	Boring Completed to 30' on 2/23/82	()	Pocker Readii	Pen g, T	etron SF	eter
			•		35-	* Shelby Tube Hydraulically Pushed at 600 PSI					:
					- 40-	**Loose, Brown to Dark Brown (10YR 4/3) Fine to Medium Clayey SAND, Trace Gravel (SC)					
					45-						
		1				(Continued)				1)



ENGINEERING INC

LOG OF TEST BORING

Project Badger Army Ammunition Plant

... Location Baraboo, Wisconsin

Boring No. ELN-82-04A Surface Elevation 921.4

__1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848____

SAMPLE Recovery Moisture				E		VISUAL CLASSIFICATION	SOIL PROPERTIES						
Recovery No. Type		Recovery Moisture		1	and Remarks	da M		LL	PL	0			
No.	Type	+	+	N	Depth								
					<u> </u>	Boring Completed from 30' - 153.5' on 3/26/82	-		-				
				-		Unit: SAMS-1	-		 				
					F	Chief: Tom O.							
					- - - -								
		3.01		-		Dense, Dark Yellowish Brown	-		 				
) ——	SS	18"	<u>M</u>	44	55-	(10YR 4/4) Fine to Coarse SAND and GRAVEL, Little	-						
					Ė	Silt, Occasional Cobbles (SP-SM)							
					È !		L						
					F 60-								
					E								
					F								
					Εı	<pre>* Encountered a Layer of Cobbles from 47' to 53'</pre>	-						
				 	65-	From 47. to 53.	-						
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		7.511			E	Dense, Very Pale Brown (10YR 7/4)				-			
0	<u>s</u> s_	15"	<u>_m</u>	50	80-	Fine to Medium SAND, Some Gravel, Trace Silt (SP)							
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LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

Boring No. ELN-**9**2-04A
Surface Elevation 921.4
Job No. C.10313
Sheet 3 of 4

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1	SAMPLE						VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	IES
F	Recovery Moisture No. Type v v N Depth		Depth	and Remarks		w	LL	PL	D			
	11	SS		М								
	12	SS	NR	M		5 5 5 6 7 7 7 7 7 7 7 7 7 7 7 7 7						
۱,_						-	(Continued)					,



ENGINEERING INC

LOG OF TEST BORING

Project Badger Army Ammunition Plant Location Baraboo, Wisconsin

Boring No. ELN-82-04A
Surface Elevation 921.4
Job No. C 10313 Sheet 4.... of 4.....

1409 EMIL STREET . P.O. BOX 9538, MADISON, WIS. 53715 . TEL. (608) 257-4848-

SAMPLE Recovery Moisture						VISUAL CLASSIFICATION	SO	L P	ROP	ERT	ries
	Recovery Moisture Type + N Depth					and Remarks		w	u	PL	D
lo.	Type	}	ţ	N	Depth						
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					El						ļ
					<u> </u>	·					<u>.</u>
_	[]				E. I						
_					150	Very Dense, Very Pale Brown					
					El	(10YR 7/4) Fine to Medium SAND, Some Silt & Clay (SM)]]				
3_	SS	18"	W	78	FL		-				ļ
_	<u> </u>				155	End Boring at 153.5'					
					-133						
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	<u> </u>	·!	w	ΔΤ	' 	EVEL OBSERVATIONS	GE	NER	AL I	NO	TES
<u>_</u>		'									
	ile Dr			-65			Start	2/23/ Chief	Y€om WG/JS	plete 5	5-1
	on Co ne Af				Prilling 노 hour		Drillin	chiet on Met	nod C	S 0-	10'
	oth to			.			FA	ng Met 10-30			
	ntla te			. •	32.0		TOM/	MO30	-153.	5'	

ENGINEERING INC

LOG OF TEST BORING

Project	Badger Army Ammunition Plant	
	•••••••••••••••	Ĺ
Location .	Baraboo, Wisconsin	ł

Boring No.	ELN-82-048
Surface Ele	vation 921.9
Job No	C 10313
	. 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS, 53715 • TEL. (608) 257-4648...

SAMPLE Recovery Moisture No. Type				Ì	VISUAL CLASSIFICATION	SO	L P	ROP	ERT	IES
					and Remarks		W	u	PL	0
to. Type	e +	1	N	Depth		q.		<u> </u>	PL.	
				F		1 1				
				Εl	NOTE: For more detailed					
1 1 1 1 1 1		ΕJ	subsurface information,							
				refer to Log of Test Boring No. ELN-82-04A						l
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	-		-	臣丨	Based on Cuttings Obtained by	1				
				F150	Based on Cuttings Obtained by Driller, Well Installed in:					
1				E	Fine to Coarse GRAVEL and SAND, Trace Silt	+ 1		!	•	·
			-	主十	End Boring at 165'	+				
			 	╞ ┪						
				Εl						
			-	Εl				-		
				200				<u> </u>		
		M	/AT	ER	EVEL OBSERVATIONS		NER			
Jpon (Drilling Compl After D	etior		Drilling.		Crev	/26/8 v Chief ng Me	F	₹ia	# 10 -
	to Wa		~ - -						********	••••••
-	to Ca		_						•••••	



ENGINEERING INC

WARZYN | LOG OF TEST BORING

Dadam A A tot Da	Boring No.
Project Badger Army Ammunition Plant	Surface E
	Job No
Location Baraboo, Misconsin	Sheet].

Boring No. ELN-82-04C	
Surface Elevation9).
Job No. C 10	• •
Sheet 1 of 1	

SAMPLE Recevery Moisture						VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	TES
Recevery Moisture No. Type + N Depth				Depth	and Remarks		w	ш	PL	D	
					E-						
<u> </u>				F	·			·			
					<u> </u>	· ·					
					<u> </u>	·					
					F.,						
					-50- - -	NOTE: For more detailed subsurface information, refer to Log of Test Boring No. ELN-82-04A				-	
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					E						
					E. I						
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					E	•					
	-				E150						
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_				·							
					<u>-</u>	End Boring at 173'					
					-200 -		-				
			W	GE	NER	AL I	TON	ES			
Upo	e Af	mpk ter C	etion Orillin	LEVEL OBSERVATIONS	Star Crev Drilli	/25/82 v Chief ng Met	Com LF F	plete	25/82 MS-1		
Depth to Water											·····/

FIELD BORING	LOG	BORING N	0. NPM-39-0/	
PROJECT NO.: 6049- C	PROJECT NAME: U		PAGE) OF 2	
DRILLING CONTRACTOR: N	MATHES 0	PRILLER: Mex Tinner	DATE STARTED 10/	7/89 COMPLETED /0/25/84
METHOD: Rotary	CASING SIZE: 9'n	TIP eV:	PROTECTION	LEVEL: D
GROUND ELEV.:	SOIL DRILLED: 1/7. C	WATER LEVEL: C	TOTAL DEPT	"H: [/], C'
LOGGED BY: J. BUSS	CHECKED BY:	P. Bolac 10	ATE: 11/33/69	

SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6-INCHES	PEN. REC.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONET	TORING
S#1	01.00	7-84		Black to gray organic topsoil grading to gray sitt (loess) -OL-ML moist-wet - Few cuttings.	Easy driving	Birg	16
S#Z	n-20			Brown fine SAUD wt silt and sittle mederse sand SA		Bhyd	7
S#3	20 -30	-		DRY, MOD GENERO, SM			
 5 ± ų	30-40			BROWN SAND, MEDIUM, SOURS			
				RESUME DRIVING CASING			
5#5	40-50			LIGHT BROWN SAUD, MED-FINE, DRY, POOR GRADING, SANGE FINE GRANGE SP		skep	
5*16	<i>හ −</i> (හ			CIGHTBROWN SAND, MED-FINE, SLICHTT OMMP, PUOR GRADING, I GRAVEL MT 55-SCOTT, TR FINE CRAVEL, SP		êk eq	
3 #7	60-70			LTBRN SAND, MEDUN, SM FINE, SANDLING, GRAVELLY,	More	B/6.	P# 0
3 8	70 -80			PRAVEL DENSE - VERT DENSE FROM 70 - 75, RUNDED, WELL CARDER GW	2 ppm Answer	Bec	

FIELD BORING	G LOG		В	ORING NO). N	PH.	. જુન્	-0-	
PROJECT NO.: 6049-	CY PROJECT NAME	: USATHAMA- I	BAAP			PAGE	2_	OF	2
DRILLING CONTRACTOR:	MATHES	ORILLER: A	lae Tinnin	DATE S	STARTED IC/V	1/89	COM	PLETED	10/25/84
HETHOD: ROTERET	CASING SIZE:	IN	TIP eV: /C	.6	PROTECTION	LEVEL:	ũ		
GROUND ELEV.:	SOIL DRILLED: //	1.0 WA	TER LEVEL: 84 F	۲.	TOTAL DEPTH	l: //	1.0		
LOGGED BY: D. Ber	CHECKED	BY: P. Bol	DATE:	ulza/	gg				

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,

SAMPLE	DEPTH IN	BLOWS PER	PEN.	N. 741 6793A	COMMENTS ON	MONIT	TCRIN
NG.	* FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LE!
#9	80-90			CRANEL, DENSE - VETT DENSE ROUNDED, WILL CRADER, GW	3ppm More	BOSD	
#10	90-100			GENELY SIMO, ONE-MED, SOUR FINE GRAVE WET, SI COOP LOOSE, SW (TO 93 FT.)	(3) spin	Bels	}.
				CRAVEL, MODIUM DOUSE, ROUNDED - MNGULAR, WELLGRADED, WET, SI ODOR, GW	1	ppm	·
5*N	100-110			GRAVEL, S.A.A. GN	1,	. لمحل	
* 12	110-111			GRAVELY SIND, VERY CORRSE-HEDIUM WET, LOOSE, SW		Spp	
				EOB @ 3:20PM 111			
							<u>.</u>
	1						4

FIELD BORING	LOG	Boring No. PPM-9101
Project No 06853-03 Project Name BADG	er AAP	Page of
Contractor LAYNE Driller 6-2	POPULUE Date started /	0-25-91 completed 10 - 25-91
Mestod Dual WALL Casing Size 4"0.D.		Protection Level 5
Ground El. Soil Drilled //b'	4 below ground 98.5	Total Depth //0'
Logged by ZRR Checked by DT	P Date 10/30/91	

Sample	Depth in	Blows per	Pen Rec	Description	lamores et Bouse M			e princip
No	Feet	6 inches	HEC		Advance of Boring	H	10	LEL
5-1	0-10'			BROWNISH RED SILTY SAND, WED, F. TR F GRAVEL, TR. CORBLES	(2)	TAR	AIR	0
	10-20'			BROWN-RED SILTY SAND, WGD, M-F, LITTLE C SAND LITTLE F-C GRAVEL		0	0	0
5-3	20.30			LT BROWN SAND, WCD, M, SOME F, LITTLE C, LITTLE F CRAVEL, TR C GRAVEL.	©	•	0	đ
ડ-પ	30-40			CORRIE AND BOULDER BONE W/ LITTLE F GRAVEL, E SAND.		٥	•	6
5-5	40-50	40 47	-47 -50	SAME AS ABOVE COBBLES AND C CRAVEL W/SOME FERENCE AND LITTLE FEAND, TR SILT	MAY BE PUSHING A COBBIL W/ CAS MA	٥	•	6
5-6	50 - 60	50- 57-	57 60	SAME 4: 42-50' LT BROWN SAND, PLD, FM TR C, TR F GRAV, TR SILT				0
5-7	60-70'			LT BROWN SAND, WLD, F-M LITTLE C, LITTLE F GRAV, TR CGRAV		0	6	a
s-8	70-80'		76°	F, SOME C LITTLE GORBIES	3	•	0	•
5-9	80-90'			SAME AS 76-80 EXCEP.	(SD)	°	°	•
5-10	90-100'			LITTLE F, LITTLE C	(E)	0	0	•
5-11	100 -110'	·		LT BROWN - BROWN FANDY GRAVEL AND GRAVELY SEND, WER SAND: C, SOME M, TR F GRAVIL: F, LITTLE C	(3)(3)			

FIELD BORING LOG	BORING NO. RPM-89-0/	
PROJECT NO.: 6049- 04 PROJECT NAME:	: USATHAMA- BAAP	PAGE OF Z
DRILLING CONTRACTOR: MATHES	DRILLER: Mar Tinnin	ATE STARTED 10/15/89 COMPLETED 16/89
METHOD: TH-60 CASING SIZE: 9,	n TIP ev: 10.6	PROTECTION LEVEL:
GROUND ELEV.: SOIL DRILLED: / G	27 WATER LEVEL: 109.7	TOTAL DEPTH: 137
LOGGED BY: Jin BASS CHECKED B	17: P. Boline DATE: 11	/,32/59

SAPLE NO.	DEPTH IN	SLOWS PER	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONI	TORING
			REC.			TIP	•
S#/	0-105			Gray Brown In-med SANI wt/crse sand and tree gravel wood chips FILL moist SM-SA	easy advance TIP 6 kg 4-9		Ю
<i>5</i> *Z	10-209			and red-brown In-med SANN with zones of Crose Sand and grave blue plastic? at 11/5 ft FILL moist SP		1.0	9
5*3	20- 3 04			light graybrown sitty sine SAND wit fille Med Sand and sine sandy and SILT wer ML-SM		-1.6	
S4	30-40H			light gray brown In-med SAND ut occasional gravel layer boulder some at 37-38 St. SM moist		0.3	8
\$ 5	40-50			light Brown fine SAND wt med. Sand and gravelly zone boulder at ~45' moist-dry SM	TIP BKgd=ZA	0.0	7 .
56	50-60			light gray brown Sine-mad SAND wit gravel Zones SM		0.0	7
		_			~.		

FIELD BORING	LOG		ВО	RING NO. RF	M-89-6
MOJECT NO.: 6049- 0	PROJECT NAME:	USATHAMA- BAAP		PAGE	2 OF Z
DRILLING CONTRACTOR: 8	aathes	ORILLER: MONTIN	DATE STA	RTED 10/15/89	COMPLETED D/16/39
METHOD! TH-60	CASING SIZE: 9,	TIP ev		PROTECTION LEVEL:	0
GROUND ELEV.:	SOIL DRILLED: [3	/) WATER LEVEL:	~ 109.9 4 15	STOTAL DEPTH: 13	7
LOGGED BY: J. Buss	CHECKED 8	r: P Below	DATE: 11/32/	<i>'</i>	

•	SAPLE	E DEPTH IN BLOWS PER FEET 6-INCHES		PEN.	2747	COMMENTS ON	MONIT	TORING
٠.	110.	PERI	0-THCKE2	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	•
	S*7	60-70			light brown medium-sine SAND Dry, tree Sitt occasional gravel cones SM	Bkgd=8-9	10	ष्ठ
*	2 4 8	70-80			light brown fine SAND ut gravel and cobble and bonder zones dry #5M	hard driving	12	8
	9	70-90			light brown med Sine SANI wt/some crose sand and gravel dry. SM	hard driving	bkg	/
	S#10	90-100			brown med sine SAND wt occasional gravel moist, becoming wet at 1955t. SMI		bKgd	
	S#II	100-110			brown med. Sine SAND wt/ little crose sand and tree gravel, grand zone at 1055+ sm			
1	s#r	20-120م <i>ا</i> ل				hard driving		

S#13 120-126

Gray Brown Gravel wt crse-mad SAND (GP)

BORING NO. RAM 89 FIELD BORING LOG PROJECT NO.: 6049- 04 PROJECT NAME: USATHAMA- BAAP COMPLETED 10/ MATHES DRILLER: Max DRILLING CONTRACTOR: PROTECTION LEVEL: TIP W: 75 10.6 CASING SIZE: SOIL DRILLED: 115' TOTAL DEPTH: 11551 WATER LEVEL: 96 St DATE: 11/27/59 CHECKED BY: P. Bolow

SAMPLE MO.	DEPTH IN	G-INCHES	291.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONITORING		
	PEEI	TIP	Út.	DESCRIPTION	ADVANCE OF BOXING	TIP	LEL	
5#1	0-10	-0.3	6	Black organic rich topsoil sover silty clayey loess OL - ML-CL	fast casy dvilling			
5-2	10-20	1.3 (8.5 bligh)	5	Brown clayers stand sity clay with fine sand solow Both moist ML-SM	//			
	15:00	[/		;				
<i>5</i> 3	30-30	6.26byb6	9	Daturch moist-dry some	generally casy dvillary			
				Fine - med sittly gravel Zones (?Till) SM	some cobbi thense arave tones.	/		
34	30-40 4 5 0	12.7(6kg/h64	9	dark mosk boulder at -355 fl. at at 30ff similar to 83 sm	anvil housing For hammer			
S <i>5</i>	50-30	9.5(761kgl)	8	Brown Sine-med SAND ut. Sine + med angular to vocanded	breaking up.			
s <i>6</i>	50-6 0	22(4kg/:7) (moisture?)	9	Fine + med angular to vounder gravel zones. 5m-5p similar to SE, fine gravel Zone at 5557 5M				

FIELD BORING	LOG	ВС	BORING NO. REM 39-00				
ROJECT NO.: 6049- 01	PROJECT NAME:	USATHAMA- BAAP	_	PAGE .	2 of 2		
DRILLING CONTRACTOR:	MATHES	DRILLER: Med Tinni	DATE S	TARTED 10/1/50	COMPLETED / C/13/54		
HETHOO: humany	CASING SIZE: 9	TIP ev:		PROTECTION LEVEL:	$\overline{\mathcal{D}}$		
GROUND ELEV.:	SOIL DRILLED: //	WATER LEVEL:	%'	TOTAL DEPTH: //5			
LOGGED BY: 13135	CHECKED 8	1: P.Bolour	DATE: 11/27				

SAMPLE	DEPTH IN	BLOWS PER	1		COMMENTS ON	MONI	TORING
NO.	FEET	6-INCHES	W.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
57	40-705		5C	Coulders + cables at 605Th Locionities with some sand. Dellers	havd driving on badders	99 (72) Okgd.	
₹ `	70-80		8.0	Brown In-med SANG and availed dense, moist, SM	Capillary Frim	7 64.	d. /
59	70-90		80	Brown In-Med SANT ist some Crse Sound moistsm		5.6 (Enb	Keret.
8/0	90 -100		9	Similar to 39 (no indication of Mr. in 39 or 510 SM maist		9 8 ÷ 6	K. ze
511	1 30- //0		80	brown med SANO as/ some find Crose Sand Trace fine arravel moist to intet 5M		0.5	
SŒ		P ₁₁₅	92		carsenins downward.	V.S.	(=C)

*Note 040' casing lost, down hole, regd. redvill ~ 20 west for well installation

@ RPM-99-01 + RPM-89-02 interchanged from SPP designations

ring N	er NAN	8101	Α		
Surface Exe	vation	911.8	32		
Job Number.	1724				
Sheet				4	

% Moisture Depth		E			SOII	. PROPE	RTIES	
		·····	CLASSIFICATION and Remarks	% Gravel	% Sand	7 P200	.LL	Pl
	x	- - -5	(U-10") Black, Silty Sand & Grave! (10"-24") Black, Sandy Clayey Silt (24"42") Brown Clayey Silt Dark Brown (10YR 3/3) Silty Clay (CL)	0	0	100	42	13
	x	-10 - -15 - -20 - 25	Brown (10YR 5/3) and Pale Brown (10YR 6/3) Very Gravelly Silty Sand (SW-SM)	41.5	52.2	6.3	NP	NP
	x	-30 -35 	Brown (10YR 4/3) Sandy Gravel (GW)	76.5	20.9	2.6	NP	NF

Badger Ammunitions Plant

Bynthetic Acid Plant

Boring Number. NAN 8101 A
Surface Elevation . 911.82
Job Number
Sheet 2 of 3

S/	MPLE							SOIL	PROPE	RTIES	
.) .	Moisture	CLASSIFICATION and Remarks		% Gravel	% Sand	% P200	LL	Pl			
	Depth						25		d		
	-										
	-50										
	-										
	-		-								
3	-55 -						:				
	<u> </u> -]					
	-60			•			·				
	-										
	- -65										
	-										
	70		410 440						}		
	x -70 -	Lare RLOMU	(10YR 6/3)	Gravelly Fin	e Sand	(SP)	3.4	94.5	2.1	NP	NP
	-					}					
-	-75 -			\$					l		
	-								ł		
	- -80			•					}		
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roject Olin Corporation Badger Ammunitions Plant. P. Synthetic Acid Plant.... Boring Number. NAN 8101 A
Surface Elevation 911.82

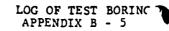
Job Number. 1724
Sheet. 3...of. 3...

SAMPLE % Moisture Depth					SOIL	PROPE	RTIES	,
				% Grave l	% Sand	% P200	LL	P1
	· ·							
		95 · ·	Brown (10YR 5/3) Coarse Sandy Gravel (GP)	82.1	17.5	0.4	NP	NP
5)	<u> </u>	105						
		115						
	X -1	120	Brown (10YR 5/3) Gravelly Medium to Fine Sand (SW)	10	89.4	0.6	NP	NP
	X -	130	Brown (10YR 5/3) Very Gravelly Sand (SW) (Groundwater level at 131.5 feet)	34.7	63.7	1.6	NP	NP

Badger Ammunitions Plant
pation Synthetic Acid Plant

Boring	nber	NAM 8	102	В	
Boring Surface	Elevati	on 914.	. 54		
Job Numb	er172	4			
Sheet					

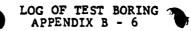
% Moisture Depth				SOII	PROPE	SOIL PROPERTIES						
		CLASSIFICATION and Remarks	7 Gravel	% Sand	% P200	LL	Pl					
	X - -5 -	(0-10") Brown Silty Clay (10"-24") Light Brown Silty Sand with Gravel Dark Yellowish-Brown (10YR 3/4) Silty Clay (CL)	0	1.9	98.1	48	23					
	-10 -10 15	Brown (10YR 5/3) Very Gravelly Silty Sand (SW-SM)	44.2	48.6	7.2	NP	NP					
,	x -20 - - - - -25	Yellowish-Brown (10YR 5/4) W Slightly Silty, Very Sandy Gravel (GW-GM)	50.2	44.6	5.2	NP	ИP					
	x -30 	Dark Grayish-Brown (10YR 4/2) Very Sandy Gravel (GW)	62	36	2	NP	NP					
	x -40	Brown (10YR 5/3) Very Gravelly Sand (SW)	43.5	55.3	1.2	NF	NP					



Project Olin Corporation
Badger Ammunitions Plant
Seation Synthetic Acid Plant ...

Boring Number. NAM	81
Surface Elevation	. 9.1
Job Number 1724	
Sheet	of3

SAMPLE % Moisture				SOIL	PROPE	RTIES	
		CLASSIFICATION and Remarks	% Gravel	% Sand	% P200	LL	Pl
	Depth		<u> </u>				
	x -50	Brown (10YR 5/3) Gravelly Sand (SW)	18	81.4	0.6	NP	NP
	- -55 - - -						
	-60 - - -	·					
	-65 - - - - - -70						
	- - - -75						
	x -80	Brown (10YR 5/3) Gravelly Sand (SW)	23.1	76.5	0.4	NP	NP
	- - - - 85						



Project. Olin Corporation.
Badger Ammunitions Plant
con Synthetic Acid Plant

Boring Number. NAM 8102 B	
Surface Elevation 914.54 Job Number 1724	
Sheer3of3	

SAN	MPLE	·		SOIL PROPERTIES					
% Moisture Depth		CLASSIFICATION and Remarks		%	χ P200	LL	Pl		
	x -100	Brown (10YR 5/3) Gravelly Sand (SW)	24	75.4	0.6	NP	NP		
	x -120	Brown (10YR 5/3) Medium to Fine Sand (SP) Slightly Gravelly	4.3	95	0.7	NP	NP		

Badger Ammunitions Plant ation Synthetic Acid Plant

Boring Tober NA	N 8103 B
Boring Ther. NA Surface Elevation	915.06
Job Number1724	
Sheet	of4

S	AMPLE	—		SOIL PROPERTIES					
2	Moisture Depth			%	% P200	LL	P1		
7	-	(0-10") Black Sandy Silt and Gravel							
	x - -5	(10"-33") Light Brown Silty Sand and Gravel Dark Yellowish Brown (10YR 3/4) Silty Clay (CL)	0	3	97	40	17		
	- -10 x -	Dark Yellowish-Brown (10YR 3/4) Sandy	1	23	76	40	19		
	-15 -15	Silty Clay with Trace Gravel (CL)	-	23	, 0	40			
	x -20	Dark Yellowish-Brown (10YR 3/4) Clayey Sandy Gravel (GW-GC)	75.7	20.1	4.2	NP	NP		
	- 25 - 25 								
	x -30	Brown (10YR 4/3) Gravelly Medium To Coarse Sand (SW)	14.4	84.6	1	NP	NP		
	-35 -	•							
	x -40	Grayish-Brown (10YR 5/2) Gravelly Sand (SW)	18.5	81.3	0.2	NP	NE		

Project Olin Corporation
Badger Ammunitions Plant
Badger Acid Plant

Boring Number...NAN 8103.B.
Surface Elevation. 915.06...
Job Number...1724.....
Sheet....2....of..4...

% Moisture		CLASSIFICATION and Remarks		SOIL PROPERTIES				
				% Sand	% P200	LL	Pl	
V	Depth		% Gravel					
	x -50	Brown (10YR 5/3) Gravelly Sand (SW)	21.4	78.4	0.2	NP	NP	
	- -55 - - - - - -							
	- - - -65 -							
	- -70 - -	- -						
	-75 - - -							
	x -80 - - - - - -85	Brown (10YR 5/3) Gravelly Medium To Coarse Sand (SW)	18.3	81.3	0.4	NP	NP	
	-			Í				

project. Olin Corporation
Badger Ammunitions Plant
Synthetic Acid Plant

Boring Number.	NAN 8103 B
Surface Elevat	ion. 915.06
Job Number	. 1724
	of

% Moisture Depth					SOIL PROPERTIES					
					% Sand	7 P200	LL	Pl		
	X	100	Grayish-Brown (10YR 5/2) Gravelly Sand (SW)	5.6	94.2	0.2	NP	NP		
		-115 -120 -125 -130			77.5 81.3	0.4	NP NP	NP NP		

	200 01 123	٠
	APPENDIX	B
ject Olin Corporation		
Badger Ammunition Plant		
Location Synthetic Acid Plant		
Pacat tau 'alarama mana mana mana mana mana mana mana		

Boring	Number.	NAN 810	3 B
Surface	Elevat	NAN 810	06
Job Num	aber, []]	724	_.
Sheet	4	sf	

3AMPLE % Moisture Depth		CLASSIFICATION and Remarks		SOIL PROPERTIES				
				% Send	7 P200	LL	Pl	
	ререп							
	E	(Groundwater level at 135.0 feet)						
	X -140	Grayish Brown (10YR 5/2) Coarse Very Sandy Gravel (GP)	54	45.9	0.1	NP -	NF	
	-							
	145							
	Ļ							
	_150	·						
!	j- -							
	155	·						
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	160							
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İ	165							
}		•						
	170					·		
	[
	⊢ ⊢175							

APPENDIX B - 11 LOG OF TEST BORING

Olin Corporation Badger Ammunitions Plant tion Synthetic Acid Plant

Boring	aber.	NAN 8	104 B		
Surface	Levati	on 92	5.11.		
Job Numbe	erl	724		,	
Sheet	1	of	4	ا٠	

SAMPLE Z Moisture Depth		}		SOIL PROPERTIES					
			CLASSIFICATION and Remarks		% Sand	% P200	LL	Pl	
	x	- - - 	(10"-24") Tan Silty Sand and Gravel Brown (10YR 5/3) Very Sandy Gravel (GW)	53.3	46.4	0.3	NP	NP	
	X	- -10 -	Brown (10YR 5/3) Coarse Very Sandy Gravel (GP)	64	35.8	0.2	NP	NP	
	X	-15 -	Brown (10YR 5/3) Very Gravelly Medium to Coarse Sand (SW)	25.2	74.7	0.1	NP	NP	
	X	-20 - - - - -25 -	Grayish-Brown (10YR 5/2) Very Gravelly Medium to Coarse Sand (SW)	44.6	55.2	0.2	NP	NP	
	X	-30 - - - -35 -	Brown (10YR 5/3) Very Gravelly Medium to Coarse Sand (SW)	31.5	67.9	0.6	NP	NP	
	X	-40 -	Brown (10YR 5/3) Very Gravelly Sand (SW)	27.2	72.6	0.2	NP	NP	

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		Ba	dger	. A ma	woit	ions	3 . P	la	at
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Boring Number NAN	8104 B
Surface Elevation.	.925.11
Job Number 1724.	
Sheet	of4

SA	MPLE			SOIL	PROPE	RTIES	
z /	Moisture Depth	CLASSIFICATION and Remarks		% Sand	7. P200	LL	Pl
	x -50	Brown (10YR 5/3) Very Gravelly Coarse to Medium Sand (SW)	39.8	60	0.2	NP	NP
	-55 - - -60 -						
	-65 - - - -70						
	- -75 - -						
	x -80 - - - - - -85	Brown (10YR 5/3) Very Gravelly Coarse to Medium Sand (SW)	28.9	70.9	0.2	NP	NP

Boring Number. NAN. 8104. B	
Surface Elevation. 925.1	
Job Number. 1724	
Sheet 3 of	

s	AMPLE			SOII	. PROPE	RTIES	
2	Moisture Depth			% Sand	% P200	LL	Pl
	x -100	Brown (10YR 5/3) Very Sandy Fine Gravel (GW)	58.3	41.6	0.1	NP	NP
	-110 -115 -120 -125	Brown (10YR 5/3) Very Gravelly Sand (SW)	31.8	67.7	0.5	ИP	NP
	-130	· —·					

٠	.Qlin .Gorporation
	.Badger .Ammunitions .P.lant
on.	Synthetic Acid Plant

Boring Number	NAN	8104	B
Surface Elevation	925	. 1 1	
Job Number 1724.			
Sheet4	u f	4	

SAMPLE 7 Moisture Depth			•		SOIL	PROPE	RTIES	
			CLASSIFICATION and Remarks	2 Grave 1	ړ Sand	ኢ P200	LL	P1
	x	140	Brown (10YR 5/3) Very Gravelly Sand (SW)	31.2	68.2	0.6	NP	NP
		145	(Groundwater level at 145.0 feet)					
		150		·				
	х	155	Brown (10YR 5/3) Very Gravelly Coarse to Medium Sand (SW)	38.6	61	0.4	NP	NP
	; ; ;	160						
	}-	165						
		170						
		175	· -					•

FI	ELD	BORING	LOG		Boring No. ORS-4				
Project No 86853-03 Project Name BAGGUE AAP Page of									
Contractor /AYNE		Ormer & Tabo	AIGUEZ	Date started	0-29-91 completed 10-29-41				
Messos Dunchne	Casing So	× 9'0.0.	HNU 11.7		Protection Level D				
Ground EL	Soil Dritte	10 76°	T pero	w ground	Total Depth FG'				
LOGGES BY KER	Check	by DRP	Date	· 10/31/A1					

Sample No	Depth in Feet	Blows per F 6 inches 7	쫎	*Description	Comments on Advance of Boring	MONI	torng
S-1 S-2	0-10'	/0-/1	Y '	BROWN SILTY SAND, WED, C, SOME M, FOME F, LITTLE F GROVEL, LITTLE COBBLES LT BROWN SAND, WCP,	Ser.	BA	
	c.			Some M, Some FGRAV, Some C GRAVEL GRAVEL AND GBBLE BONE W/ Some M-C SA			
spon ff 1		30/50/50	4		AMALYTICALS		
NO SAMA	24-30			SAME AS 14-20'			
	30-40	30-1 39-4	lo	Some A; ABOVE LT BROWN GRAVELY SAW WGD, M, SOME F, SOME C, GRAVEL: F, SOME LITTLE COBBLES	(SD)		
S-5	40.53			CRAVEL, WLO, & CRAV, SOME C GRAV, SAMS: F, SOME M, LITTLE GRAVES CICAISONAL GRAVES CICAISONAL GRAVES CICAISONAL GRAVES CITAITE BEPROCK AT 59	5°		
			-	B.O. E = 66'	QUARTEITE		

1st attempt

F	IELD	BORING	LOG		Boring No. OPB9101
Project No 68590	Project N	ame USATHA	MA	BAAT	Page _ [_ ot t _
Contractor MATH		Driller T, CA	ANK	Date started	0.23.91 completed (0.23.9)
Meshod HSA 44"	Casing Si	že	HNU TI	7(02)	Protection Level D
Ground EL	Soil Drill	17	平 bel	ow ground —	Total Depth 17
Logged by Es/L	C Check	ed by DRP	0	ne 1024/91	

TIME	Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	MO	ntorng J LEL
3750	9-1	0-2	5/12/8/	1.8	sand and gravel, comparison from readway 0.3-0.5 yellow silty sand and gravel, dease 0.5-0.7 gray violet silty clayey sand with gravel, slightly plastic in part 0.7-10 orange fract coarse sand with gravel loose, dry 10-1.8 black silty clay very dense with gravel, slightly plastic	Sample Ogioio02	Str.	UR
905	G-2	4.5-6 _. 5	2/4/9/	3/13	brown silty clay, plastic, dense, no horizonter partings becoming sandy 6.0-6-5 and moffled dark brown.	ANALYTICAL SAMPLE 09101006	akin	a X is
	9-3	9.5-11.5		0/0	No RECOVERY	Box.dery Drilling No Shuple	_	_
0825	5-4	14.5-16.5	26/48 42/50 4"	<u>e</u> / <u>3</u>	brown sandy gravel loose this to conse sind (40%) with rounded fine to coasse gravel. dry BUGER REFUSAL 17.0 bgs	Samok	مهره	ayla

2nd redial

	270 (2.7
FIELD BORING LOG	Boring No. 0P39
Project No 685303 Project Name USATHAMA	BAAP Page I of I
CONTRACTOR MATHES ORNIET T. CRANK	
	3(102) # Protection Level D
Ground EL Soil Oritled 20 7 bei	ow ground NA Total Depth 20
Logged by & S/LL Checked by DRP O	ne 10/24/91

	Sample No	Degth in Feet	Blows per 6 inches	Pen HeC	Description	Comments on Advance of Boring	ŽÍ		LEL
1040	S-I	co-2	3 5 5 u	2.0	or species or the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of	ANALYTICAL SAMPLE	TAR E COS	\$\footnote{\pi}\$	
1050	S-2	4-6	3/4/5/5	2.0 2.0	brown silty clay plastic, dense, no gravel	ANDLYTICAL SAMPLE	arte	مايجو	
	6-3	9-11	15/50	0.3	gray loose sandy gravel. Poor receivery	Reference Sample	Bks	246	
1100	5- 4 -	14-16	25/36 38/42	2/5	brown sandy gravel loose dry fine to conse sand with rounded gravel and broken cobble chips	Analyticie Sample	BYS	त्त्रश	
1110	S-5	19-21	50	0.q 6.2	brown sandy growel poor recovery	Reference Sample			
					Auben Refusal at 20'				

FIELD	BORING	LOG	Boring No. OPSGI-02
Project No 6453-03 Project 1	vame BUNP		Page _/ of _7
Contractor MATHES	Driver Kerly Bur	Date started	5-10-91 completed 10-16-91
Method ISA/CMR 75 Casing S			Protection Level To
Ground EL Soil Drill	ed 68'	4 below ground	Total Depth 68'
Logged by RHA Chec	sed by DRP	Date 10/11/91	

TIME	Sample	Depth in	Blows per	Pen Rec	Description	Comments on		itorng	Speci
	No	Feet	6 inches	Rec		Advance of Borning		LEL	3.00
08:47	5-1 09102009	o-1.5	2/2/4	1.3	Ten fine Soud; I" thick blayer is miller of spour; Their formerse send and silt, dry. SP	Andytical sample	JAR AI	7	JŁ _j
38: <i>5</i> 0	5-7 09102007	ś6. 5	2/4/4		Brown to Black Clayer Sit; little fine send; trues coorse send and organics, dry top soil. OL	Analytical Semple	Bhy R	SE,	BL
08:57	5-3 69102012	10-11.5	2/6/8	1.5/	Gray Clayery Silt, monther; dy,	Andyticul Scruple	Bly 3	Sk)	æ,
69: <i>6</i> 2	5-4	15-165	2/3/4	1.5/ 1.5	wother, soft, damp; trace (m) medium sub rounded frame (m) and work some	Rehrence	My B	\$ Bks	Ric.
on: 15	2-5 <u>.</u>	20 - 21.5	11/6/5	1.5	Ten to bown for Send, mother, little clay; trace has gravel; boose, wet. SC	Analytical	Thy B	14 17 Kg	Br
09:24	5-6	25-7 1 .5	2/3/ 1	1.5/14	Bettom 0.8'- In to been fine send; some medium send; truch curse send out five to make subsingular grand; top 0.6'- Ten fine send; 1.1the medium send; truck course send; and damp.	Rotorone	Brown !	βk y	Τ3 ¹ -,

Fil	ELD	BORING	LOG		Boring No. CPB4
Project No 6853-63	Project A	tame BAAP			Page ot
Contractor (NATHE)		Ormer Keirin B	nschmeter	Date started	long completed 10-10-9
Method HSA/CMR75	Casing Si	že —	HNU 11.		Protection Level To
Ground EL	Soil Drill	ed 68.	T bek	w ground	Total Depth 68'
Logged by RHA	Check	ed by DRP	Da	10/10/91	

										.
TIME	Sample	Depth in Feet	Blows per 6 inches	Aer Rec	Description	Comments on Advance of Boring		_	rng	٠,٠
` <u>`</u>		700.	0				TAR	-	LEL	124
09:33	S- 7	30-31.5	4/5/7	1.5	Ton Fine Soul; trace	Reference				
0 1. 3				1.5	coerse send. "4" think gray		弘	٦,	ar?	RL
			i		cley lense 0.41 from button of		1 1	1		'
					spanjdry. SP					, 1
		4 4						-		
09:46	5.8	40-41.5	WOH/1/3	1.5	Bother 0.25' - Orange + Bour	Reference		1		
				1.0	Medium to fine soul; trace	reference	82	73	BK>	Rk.
					for account of the					
					for gravel, course said and site. Top 0.751 - Olive medium			- 1		,
					sand; little every sand; trave					
					fine + modium subrunded			1		
					grand and silt; damp. To					
					fue send in shoe, su					
	5-9	50-51.5	chille	1.5/						
10:00	,		2,0,6	1.5	Bother 0.3' - Brown Silly Clay,	Roberonce	RY	RL.	7k)	Ł
				"	, , , , , , , , , , , , , , , , , , , ,		4		•	
٠.					Fine Sul; little meetium Sul,	Difficult drilling				
					true worse sub out silty	from 55-60'_				
					clay lances (thin "b"); day	Rix chattering,	l			
					CL/SP					
	5-10	60-41.5	12/19/23	1.5/	Shoe contains a collable of which	Analyticul	34	×	3k >-	,
10:14	09102062		·	1,0	appears by the enorthwrite. The		-			
				,	for set and modium Send;					
					trace for to worse subranded					
					Grand & white quarte and prote					
i					quartett; dry. SP	Augu refusel				63
						ارس اعم احد	}			1-7
						confirm u/splitge				
						مان دوراند وساله د	ì			
						Brussend homed in.	Ϊ			
Į.						see we work for notes.	<u></u>			

FIELD	BORING	LOG		Boring No. 0PB9103
Project No 6855 05 Project	Name USATT	AMA	BAAP	Page _ 1 _ or _ 3 _
Contractor MATHES	Ormer T. CR	ANK	Date Started	D-10-91 completed 10-10-91
Method HSA 44.50 Casing S	ize	HNU 11	7/103 43	Protection Level D
Ground El. Soil Dri	Hed 99'	平 bet	ow ground92.5	Total Depth [D]
Logged by SANDIN Chec	ted by DRP	O	ne 10/11/91	

1	Sample	Depth in Feet	Blows per	Pen Rec	Description	Comments on	Monitoring
	No	Feet	6 inches	Hec		Advance of Boring	HNU LEL
0	89103:42 S-1	0-2	3/3/9/12	1.7	clay moderately plastic	ANAWTICAL SAMPLE	TAR AIR
					friable and very dense with depth, grass and reed rects in upper foot, some crange		\$
' 5'	5-2 09103006	4-6	3/6/1/12	2,0	Motthing in fricible clay. OH OL GRAY TO BROWN modified silty clay to S.U. S.U 6.0 readish	ANALYTICAL SAMPLE	340
3 0	S-3	9-11	3 5 6 5	2,0	Brown sund, fine well sorted with accounts contact tan milling loose, wet.	ANALYTICAL SAMPLE	846
	s- 4	14-16	1/2/2/3	2.0	Brown to reduch crange fine sand to sitty sand one large rounded gravel,	Reference Sample	ON V
S	S-5.	19-21	12/3/2	2/9 19	track small rounded	ANALYTICAL	946

FIELD	BORING	LOG		Boring No	O. OPB9)
Project No 685303 Project N	BOTHA USATHA	IMA BA	AP	Page 2	01 3
Contractor MATHES	Driller T. CR	AIJK Dar	e started 10/	0/91 completed	10-10-91
Method HSA 4410 Casing Si	te	HNU 11.7(10	5 #3 PM	tection Level D	
Ground EL Soil Drille	99	T pelow 9	round 92,5 Tot	al Depth ID/	
Logged by R.S. Check	ed by DRP	Date /	0/11/91		

Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monite	orng LEL
S-6	24-26	244/6		tan to orangebrown mottled fine to medium sand. well softed, losse wet coarser texture than 8-5 SP	reference Sample	TAR ATR	
S-7	39-31	11126	7.7	tan to light brown sand, fine well sorters to very fine sitty send domp, loose sm	RRFER(NCE SAMPLE	مهنهم	
5-8	39-4I	9/13/18/ 25		bowingray Asilt ar sandy sitt alternating with fine sand. Silt is dense and mederately plastic. Wet in places Sc	REFERENCE SAMPLE Seulogic change	9×4	
s-9	49-51	20 42 40/47	2,0 2.0	light tan finite to coarse sand and rounded graves. losse, dry. (+1117) Es SP	Arferre Sample	Bra	
				finic gravel. loose, by	Référence Sample	gks	
3-11 ♦ €5. 0910307		42/20 33/37	2/2	tan very fine sand lasse dry, very well sorted with areas of dense silt at se 69.2-69.3, 70.0-70.1, and 70.5-70.6 Angular contact	Analyticia Sample 09103071		

FIELD BORING	LOG Boring No. 0989103
Project No 685505 Project Name USATHA	MA PAAP Page 3 of 3
Contractor MATHES Driller T, C	RANK Date started 10-10-91 completed 10-10-91
Method HSA 4%-10 Casing Size	HNU 11.7(10.2) 4 3 Protection Level 5
Ground EL Soil Drilled 99	4 below ground \$2.5 Total Depth (D)
Logged by E. S. Checked by DRP	Date 10/11/91

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Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring HNU LEL
S-12	79-80	18/50	0.3	boose Sand and fine to medium rounded gravel SP	Reference Sample	TAR ATR
S -13	89-90	(7/37/50 Fea E n	1.5 i.5	LEGSIE FINE SAND W/ SMALL PERCENT OF ANEUME TO ROUNDERD CRAVEL, DRY SP	Reference	
5-14 091031e1	99-101	2/3/4/ 15	2/2 0/0	Brown fine to coarse sand, loose, saturated trace gravel sp	Analyticae Sample	
				Bob 99, augus 101 spoon		
				Water I level in augers		
				92.5' b.g.s.		
					·	
			·	•		

FI	ELD BO	DRING	LOG		Boring N	NO. OPB9
Project No 6853-03	Project Name	USATH	AMA	BAAP	Page	01 3
Contractor MATHI	is Or	iller T. Ci	PANK	Date started t	0-10-91 complete	10-11-91
Method HSA 4'4"	Casing Size		HNU 11.	7(10.2) 4-3	Protection Level	D
Ground El	Soil Drilled	99.5	T belo	w ground 89.5	Total Deptn 91.5	,
Logged by E.S.	Checked	DRP	Oat	te 10/11/91		

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FIEI	LD BORING	LOG	Boring No. 0989104
Project No 6853'03 P	roject Name USATHA	MA BAAP	Page of3
Contractor MATHES	Dritter T. CT	LANK Date started 10-	-10-91 completed 10-11-91
Metros HSA 41/4" C	asing Size	HNU 11.71(0.2) 4 3 Pm	otection Level D
Ground EL S	oil Drilled 89.5	4 below ground 97,5 To	a Depth 91.5
Logged by ES	Checked by DRP	Date 10/11/41	

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Sample	Depth in Feet	Blows per 6 inches	Pen Rec	* Description	Comments on Advance of Boring	Monitoring
5-6	24.5 - 26.5	8-29-	2.0		Refigence Sample	TAR AIR
S-'7	29.5 - -31.5	1-17- 24-40		29,5-30.1 fine to medium sand with small grave. loose dry 30,1-31,5 fine sand well sorted dry, some brown motthing sp	Reference Sample	Q)tricky
5- 8	39.5- 41.5			Sand tan fine to coarse. with trace small gravel. coarser towards bettom. I rose, dry. SP	Ryterene Sample	QXY)
S-9	49.5 - \$1.5	4-12 - 16-18	ن ایر ایر	tan sand fine loose damp well sorted. Silty sand lense at 50.8 with bedding a 45° to verticion irregilar top contaut slump or ice melt secture?	Reference Sample	BKo
5-10	57.5 - 61,5	10-17- 20-28	5/2.	silty sand, silty clay grey with occassional arange red mothing. laminations on et-45? slump feature appearence	Sample	gre

FIEL	D BORING	LOG	Boring Nc. Prag
Project No 6953 DE Pro	HECT NAME USATT	IAMA BAAP	Page 3 ot 3
Contractor MATHES	Driver T. CI	RANK Date started	10-10-9/ completed 10-11-91
Method HSA 44" Cas	ing Size	HAU 11.7 (10.2) # 3	Protection Level D
Ground EL Son	Drilled 99.5	4 below ground 89,5	Total Depth 91.5
Logged by E.S.	Checked by DRP	Date 0/ 1/91	

Sample No	Depth in Feet	Blows per 8 inches	Pen Hec	Description	Comments on Advance of Boring	Monito	
S-11	10-17		2.0	sand very fine to fine well sorted, angled kimina and slumped appearance. damp,	Reference Sample	TARATE GKG	
5-12	79,5- 81.5	7-14- 17	2/20	loose SP tan v. Fine sand loose day well sorted SP	Reference Sample	346	
S-13	89.5- 91,5	7-8- 10-20	2,0	light brown viting sand to silty sand non plastic, wet sm	Analyticia Sample 09104091	976	
				BOB AUGERS 89,5 LAST SRITSROW 91.5	·		
				WATER LEVEL MEASKED IN ALERS 89,5 bgs			
·			·				
·		·					

19/1/91

FIELD	BORING	LOG	Boring No. OPB-11-03
Project No 6 853-03 Project	Name BAAP	,	Page _/_ of _3
Contractor MITHES	Driver kork B	marken Date started	0-10-91 completed 10-11-91
Method HSA CME 75 Casing			Protection Level TO
Ground El. Soil C	rilled 43	4 below ground N. K.	Total Depth 93
Logged by TRHA C	ected by DRP		

TIME	Sample	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitorng	: ماحية موحري
15:23	5-1 Mic 5003	0-1.5	2/2/5	1.3	Bottom 0.7 - Brown Silty Cley, soft, organics; trace for grand; Top 0.6'- Boon to Black Clayery Silt; organics, trace for sand; dry- Top wil. OL	Analytical	TAR AIR -NA BY BY	P.
·5:32	5-2 काक्ट ^{०7}	<u>-</u> 5-6.5	1/3/7	15 15	100se; Top 1.3' Gray Silty Clay, mother, soft;	Analytical	Bl Fish	GK)
5:40	5 ~ 3 cqoso.z	10-11.5	3/4/10	1.2	fine soul; trace silt and fine rouself growel; 4. middle 6.7-1.0- Brown fine soul; some silt; trace elegy; Top	Analytical	24 24	74
5: 47	5-4	15-16.5	12/4/22		1.0-1.2'- Brown fine send; little sit; trace corresor send; dry: CL/SC BoHam 0.7'- white fine Send; trace medium End; Top 0.7-1.5'- Brown fine Send; 1.41e medium send cuk sit; trace clay; dry. SP/SM	Reference	Phy Phy	R

+ LEL buttery want dead.

Bkg. = Background - Oppm

	BORING	LOG	Boring No. OPBAL-O
Project No 6853-03 Project	Name BAAR	,	Page _ 2_ of _ 3
Contractor MATHES	Ormer Keith	Burlinge Date started	10-10-C1 completed 10-11-91
Mestag HSA/CMETE Casing	Size 4,75"	HNU 11.7(10.3)	Protection Level D
Ground EL Soil Or	wed 93	I below ground, we	Total Depth 93
LODGED BY RHA CH	crued by DRP	Date 10/11/91	

Time	Sample	Depth in	Blows per	Pen Rec	Description	Comments on	Mo	nitorn	0	»L ,
1,00	No	Feet	6 incres	HEC		Advance of Boring	HN		EL	SPI
041020SS	5-5	20-21-5	10/18/19	1.3	Bothom 0.4' - Tom To brown fine Send; come medium Send; trace s. 14; Top 0.4- 1.3'- Tom To brown fine Sond; little s. 1+; dry. 5?	Anelytical	TAP. 以			K
16:00	ς-6	25-26.5	12/25/32	1.5		Zelerence	践	St _a		ukj
16:05	5-7	30-312	16/17/23	5/4	median out fire sunt; some softy from each in thick leases (20): Top E.Y. 1.4 - The Free soul; day. 57/500	Refurence	Bkj	TV,		
16:22	5-8	40 - f15	13/19/33	1.5	•	Reference	改	Biz.		BK
16:40		•	16/27/43	1.5	Buttom 0.5' - Ten mediamond fue send; truce course send; Tup U.5-1.5 Ten fine Send; truce mediam and course	Reference	7sky	Gk		BLS
1¢:.53	5-10	60 - U .S	12/25/36	15	sons; day, SP Ton fine Sout; little modum sout; tome worse soud; day SP	Zeforma	对	81		BL

FIELD	BORING	LOG	Boring No. ORALOS
Project No 2853-03 Project	Name BAA?		Page 3 of _3
CONTRACTOR MATHES	Dritter Keine &	Aselman Date Started 10.	-10-4 completed 10-11-91
Method (15A/CMF75 Casing S			rotection Level D
Ground EL Soil Drill	es 93	I below ground How To	otal Depth 93'
Logged by Rith Chec	wed by DRP	Date 10/11/91	

TimR	Sample	Depth in Feet	Blows per	Pen Rec	Description	Comments on	Monito		S 2-
17:12	S-11	70-71.5	6 inches	1.5	Ton fine soul; truce Sit, if fine to medium subangular grand; dry, loose, SP		TAR AIR	NA	2°-
17:41	5-12	 ८०-४। <u>२</u>	39/58/ ₁₀₅	1.5	Ton to brown medium scul fittle some fine soud; little course scul and fine to medium subrounded grand; dry. Gw	Reference	Pkj_ 154		Bk _j
0	5-13 onescor	90-91.5	28/52/55	17/1/2	Bottom 1.3'- Ton Fine Sent; little Sit; time chy; Typ 1.3-1.5'- Brown silty chy; 1.the fine sincl, soft; dry	Anely tiech	وني البي	Bhy	Bk _,
	· 5-11	ENA IOCTOR		•	SM/CL	Auger refusal rut 93' bgs T.D. 93'			
; ; i						 .			
			·			·			

		BORING		Boring No. OPB.91-0
Project No6953-0	3 Project N	ame USATHA	ma	Page of
Contractor MATH	<u> </u>	Driller & BUIS	CARTER Date	started 10/23/91 completed 10/23/71
Method IHA			HNU 11.7/10.2	
Ground EL	Soil Dritte	d 10'	4 below grou	und Total Depth (2'
Logged by WULLA	Checu	od by DRP	Date (0/;	23/91

Sample	Depth in Feet	Blows per 6 inches	Pen	Description	Comments on Advance of Boring	Monstoring
5-1	0-2'	6-10-	15° 20'		Applytical	TAR ATT
•	÷.			gravel, Some to little medium to confe Sond, weelly-gladed non-plantic, massive medium dense, dry		
5-2	5-7'	15-15 - 14-20	20	Brown Madium SAND, and COBBLES/GRAVEL, Some to little course Send, and Silt,	ANALYTICAL	3k~
				pools graded, non-plantic, massive, nedim dense, dry		
5- 3	Ø·12'	16-40- 44-45	20	Brown fine to median SAND and COBBLES/ Gravel, 1. He Collect Send and Sixt, fairly Gradel, non-plantic,	ANMYTICAL	₹X.
				massive, very donce, ary		

12' dept by

F	IELD	BORING	LOG	Boring No. 098-91-07						
Project No 6853-03 Project Name USATHAWA - BAAT Page of										
Contractor NATA	EB	Orller K. R.W	SELECTER Date ST	arted 10/22/9, completed 10/23/9)						
Method HSA	Casing Siz	# 4 1/4"	HNU 11.7/10.2	Protection Lavel D						
Ground El	Soil Oritic	d 10'	4 below groun							
Logged by W. CHI	CLDS Check	od by DRP	Date 10/73	3/4/						

Sample	Depth in	Blows per	Pen Rec	Description	Comments on	Monitor	
S-1	0-2.	2-7-5.	1.1	Brown organice over brown Fine SAND, COBBLES/GRAVEZ, little Silt, medicin Sand, trace course sand, well graded, non. plastic medsive,	ATVALYTICAL	HNU JARAIN BEG	LEL
5-2	5-6.3'	i3-17 50/4"	0.8	Medsin dense, dly Blown Medicin GAND, COBBLES/GRAVEL, Some Silt and fine sond, 1:Hho course sond, well graded, non-plostic,	ANAZYTICAZ.	34.5	,
5-3	10-11	5/75	0.8	Brown Madwin SAND, COBBLES/GRAVEZ, Some carse sand and silt, little silt, well graded, non- Plastic, very dense,	ANALYTICAL	BA	<u>, </u>
		·	·	TERMINATED boring at 12.0' depth bys			

F	TELD	BORING	LOG	Boring No. 098-91-08
Project No	Project N	ome USATH	AMA - BAAP	Page 01
Contractor MATI	たら	Ormer K. B.W.	ANNER Date starte	d 10/23/91 completed /c /23/91
Method 13A	Caung Su	= 44"ID	HNU 11.7/10.2	Protection Level D
Ground El	Soil Oritie	d 10'	4 below ground	Total Depth 12
LOGGES by WILTIL	95 Checu	ed by DRP	Date 10/24/9	7/

Sample	Depth in	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monito	
5 -1	0-2'	4-6-6-	1.3	Bram fine to ned SAND Some gravel and silt little crosse sand, well graded, non-plastic, medicin dense, dry	Author	JAR AIR	LEL
5-Z	5-7'		2.0	Brown fine to course SAND and GRAVEZ, Some siet, well- Graded, non-plastic dense, dry	ANALYTICAL	84	K (
5-3	10-11	27-75°.	0.8	Tan feir to course SAND and GRAVEZ, little silt, weel-graded, non-plastic very desse, dry		3K	55
		·		Eminated boring at 17.0' depth bys			

FI	ELD	BORING	LOG	Borin	g Na089+09
Project No			AMA - BAT		ge of
Contractor MATH	ಕ	Ornier K. Pul	KENEYET Date s	samed 10/23/91 con	npleted /0/23/9/
Metros HSA	Casing Siz	10 4/4" ID	HNU 11.7/10.2	Protection Le	vol D
Ground EL	Soil Ortik	16'	4 below grou		12'
Logged by WCHILD	Check	ed by DRF	Date 10/7	4/91	

Sample	Depth in	Blows per	Pen Hec	Description	Comments on Advance of Boring	Monitorn	_
5- 1	0-2'	2-4-3-3	1.3	Brown fine to medium	ANKLYTICAL	TAR ATR	EL_
5-z	·. 5· 5.7'	45.50/3.	2.0	SAND and GRAVEL, some silt, Hace Course sand, well Graded, non-plastic loose, dry Brown frie SAND and GRAVEL, come needing and, little silt, of an area sand, well galed non-plastic, very dense, dry, socke fragment		34	
5 3	10-12	15-15- 13-13	1.7, 2.0	on tip 00-1.0 Brown frie I median SAND and GRANEL, Some siet little Course Sand, well Graded, non-plantic, dense, dry 1.0-2.0 Ten Median SAND, Some to little	AMEYTICAL	84	
	·			fine and course soul, Poorly gladed, non-plastic medium donce, stratified Terrinaled boring at			

12.0° depth Bas

Project No	Project Name USA-17	AMA BAAR	Boring No. Ofb-91.
Commetter MANY			123/2) completed /0/73/91
Method HSA	Casing Size 4/4"	HNU 11.7/10.2	Protection Level D
Ground El	Soil Drilled 8	4 below ground	Total Depth 8
Logged by WCHIL	25 Checked by DRP	Date 10/24/91	

Sample	Depth in	Blows per 6 mones	Pen	Description	Comments on Advance of Boring	Monito	
S-1	0-2		15	Black organico over blown SILT, some fine	AMNYTICAL	JAR ATR	LEL
•	<u>.</u>			Send, Hace fre Joseph, poorly graded Slightly plastic, med. dense, moist			
S-2	5-7	17-30 11-16	2.0	Brown/ton fine to medium SAND and	ANALYTICAL	BL	
				fui CRAVELy Some drivse sal trace			
				set pull gradel.			
				Refusal at 8; 8; and			
				Terminate 3rd alkryd			
				at 6' hgr			
		,	·				1

FIELD BORING	LOG Boring	NO. OPPAIL
Project No 685303 Project Name USATHA	MA BAAP Page_	/_ ot _/
Comractor MATHES Driller T. C	LANE Date started 10-23-91 comple	ted 10-23-9/
Method HSA 4/4" Casing Size -	HNU 11.7(10.2) # / Protection Level	D
Ground EL Soil Drilled 9.5	4 below ground - Total Depth 11,	5
Logged by & S/LL Checked by DRF	Date 10/24/9)	

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Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring HNU LEL
S-1	0-z	1/8/7/	2.0	brown silty gravelly fill, 30% fine-coarse sand, dense, slightly plastic in places	Analytical of Sample 09111002	By By
C-Z	4,5 - 6.5	43141	2/5	brown silty gravelly sandy fill. asphalt precess, round to angular gravel, moist,	Analytical Sample 09111006	\$ 3
5-3	9.5 - 11.5	26 (22) 27 (50		brown sand with 30% gravel and one silty clay clast. 'louse, dry, quartzite chips	Analyticas Semple 09111011	\$ \$
				130B 9.5 augers		
			,			
		·	·			

	Sample	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Mo	nitorr	
1500	S-1		2/4/4/	10 x	0-0.4 brown silty Sindy topsvil unto organics (roots) and gravel, crumbly textione 0.4-1.8 browngray silt, dense, maist, trace gravel, oursission sand, parts along norzental plane	ANALYTKAL SAMPLE 09113002 :	THE .		EL
1510	5-2	4 .5 -6.5	1/2/3/4	3 S	brown sitt, orange nothing, dense, damp,	ANAUTHAL SAMPLE 09113006	0)V/G	940	
1525	S-3	9545 9.5 - 11.5	50) 4	3/2	brown sand, loose dry, fine gravel poor recovery BOB 9.5 AVGERS 10 Spoon	ANALYTICAL SAMPLE O 7113 011	4) You	844c	

FIELD	BORING	LOG	Boring No. 0989113
Project No 685303 Project	Name USATH.	AMA BAAP	Page of
Contractor MATHES	Ormer T. C.F	ZANK Date Starter	10.23.41 completed 10-23.91
Method HSA 4 14" Casing	Size	HNU 11.7(10.2) # (Protection Level D
Ground EL , Soil Dr	Med 8, 9, 9	4 below ground —	- Total Depth 1.0
Logged by E.S/L.C. Che	oved by DRF	Date 10/24/9	

Sample	Depth in Feet	Blows per 6 inches	Pen	Description	Comments on Advance of Boring	_	nito	
S-1	0-2	2 9	2.0/0.6	brown silty topsoil with organics. Have graved, moist denve	ANALYTICAL S SAMPLE 09113002	TAR TOT		LEL
S-Z	4.5-	10/7/ 5/6	ا به 6/6		SAMPLE O9113006			
				AUGER REFUSAL at 8.0 feet Move east 10 feet				
				auger returns at 9 feet	·			
				more another to ff eart—auger refusal at 9 feet no additional samples				
				taken BOB 1- 8.0 2. 9.0				-
		·		3. 9.0				

·				REDR	<u> </u>
	ВО	RING NO.	<u>'- 2190</u>	89-0	1
ρ			PAGE (OF	
Linhin	DATE STA	LT-11 CETRAL	84	COMPLETED /	1/13/84
TIP ev: (O,C	2 eV	PROTECTION LE	AEr: L	`	

TOTAL DEPTH:

73:00

LOGGED BY: MADIA GUILESAGUE CHECKED BY: P. Bolmer DATE: 11/20/89

PROJECT NAME: USATHAMA- BAAP

73'

DRILLER: MAL TIPPIN

FIELD BORING LOG

MATHES

CASING SIZE: 9"

SOIL DRILLED:

PROJECT NO.: 6049- 04

DRILLING CONTRACTOR:

METHOD: LEARNING

GROUND ELEV .:

SAMPLE	DEPTH IN	BLOWS PER	PEN.		COMMENTS ON ADVANCE OF BORING	MCN I	TORING
NC.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BOXING	TIP	LEL
S-1	0,-10,			Brown-Grey Silt Clay M Gravily Mitherage Sand F-COALSE SAND LICT GRADING TO GREY-BROWN F. SAND JUME JUT, JONE GRAVEL PAND SILT CAYESS MOLIT. GM	l'/nin		
2-7	ر. عه .			Bonders at 14, \$ 17, Brown E same sich Romn E sams ame sich	1/41.25~		
S-3	50,-30,			Some sity some charce . ROULD & AT 23' 26'	1 / 1.5 ~~		
S-4	30'-40'			THE GRACE DOULDONS AT 31' 35' 38' 6M	1/15 00		
	10, - 20,			TALL F SAUS SIME SIME SOME CRAULE - BOULD OUT AT 43'-48'	4		
	က် တဲ			TAN I SAND SOME SILT, SOME CHARL - BONDOR AT 56' M8	1.		
5-7	60'-70			TAN F. SAMO SOME SILT SOME GRAKE SM BEDROXE AT 66'	''		

MBANDONED

BORING NO. 2086401 FIELD BORING LOG PAGE / JECT NO.: 6049- 04 PROJECT NAME: USATHAMA- BAAP COMPLETED D/1/89 DRILLER: ED Clark DRILLING CONTRACTOR: MATHES DATE STARTED 10-11-89 CASING SIZE: 4.25 TD PROTECTION LEVEL: MOD D METHOD: HSA TIP eV: 10.6 TOTAL DEPTH: 18' SOIL DRILLED: 18' GROUND ELEV.: WATER LEVEL: NA LOGGED BY: D.LARUE CHECKED BY: P. C. DATE: 11/20/89

SAMPLE	DEPTH IN	BLOWS PER	PEN.	ACCOUNTION.	COMMENTS ON ADVANCE OF BORING	MONI	TORING
NO.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BOX (NO	TIP	LEL
5-1 08901- 000	0.0 - 2.0	4/6/ 7/10	<u>z.o</u> 1.5	LT. GREY TO GREY BROWN FINE SANDY SILT. DRY, NON-PLASTK. DENSE (SM) PH-4, RAD-0	5-1 ANALYTIC. SAMPLE TAKEN O.O-Z.O COBBLES O-5.0		21
5-2 008901- 005	5.0 - 6.5	5/55/70	1.5	DX BEOWN WORANGE BROWN HOTTLED SILTY SAND, TRY TO MOIST, NON PLASTIC, DENSE (SM) PH . 3 to 4 RAD-0	5-2 ANM. TAKEN 5.0'TO 6.5' COBBLES 5.0'- 9.0'		21
5-3 008901 010	10.0-12 0'	26/50/ 84 /56		LT. BROWN SANDY QUARTITE GRAVEL DRY, NON-PLASTIC (GP) pH-7 MA-0 VERY DENSE (SAMPLE COMING UP AS GRAVELY BUT ACTUAL ROCKS ARE PROB- ABLY MUCH BIGGER) OULT AFTER 3rd sample due to rough drilling conducte and are planning to move to new spcis.	TAKEN 10.0'- 12.0 BOULDERS ! 10.0 - 15.0		જી!
	·				1		

BORING NO. CPE-2902 FIELD BORING LOG PROJECT NO.: 6049- 04 PROJECT NAME: USATHAMA- BAAP PAGE / DRILLER: Ed Ciark DRILLING CONTRACTOR: MATHES DATE STARTED 10-14-89 COMPLETED 10.14 25 CASING SIZE: 425 ID METHOD: HSA PROTECTION LEVEL: MOOD D TIP eV: 10.6 GROUND ELEV.: SOIL DRILLED: 66' WATER LEVEL: - none -TOTAL DEPTH: 66' CHECKED BY: P. Bolmer LOGGED BY: D. LaRue DATE: 11/20/89

SAMPLE NO.	DEPTH IN	BLOWS PER	PEN.	DESCRIPTION .	COMMENTS ON	MONITORIN	
nv.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
5-l 0 19 02000	o'-a'	1/1/1	20 1.4	Tan, med grained cican land will sorted non- plantie very leave, dry (5P) pH-6	5-1 Analytical	- m - m	-2.
5-2 98902005	5 ['] -7'	4/4/2/4	3.0	5'-6': med brown to change to grey med on partice, well horse, moist. (SP) 6'-7: Grades in to med brown to clark grey suity clay. Moderate planticity, moist to saturated. (Mile) pH-6 *change at 6.0'	s-z Analytical	-4	
5-3 18902010	10'-12'	B 12/11	1.3	o to 11.5: Dk brown to dk gray suty elay Low plasticity. measure dense, damp. (ML102) 11.5-12.0: dark grey fine grained graitely sand. Motiling. Non plastic, Asmi- saturated. (GM) PH-6 *change at 11.5	S-3 Analytical	414	
	•				~	(

BORING NO. ES EPRUCKET FIELD BORING LOG POJECT NO.: 6049- 04 PROJECT NAME: USATHAMA- BAAP COMPLETED 10 +4 -24 DATE STARTED 10-14-49 FILLING CONTRACTOR: MATHES DRILLER: Ed Clark PROTECTION LEVEL: Next.D METHOD: HSA CASING SIZE: 4.25 10 10.6 GROUND ELEV.: SOIL DRILLED: 66' WATER LEVEL: TOTAL DEPTH: None CHECKED BY: P. Bolmer DATE: 11/20/89 LOGGED BY: D. La Rue

SAMPLE	DEPTH IN			2722121	COMMENTS ON	HONI	TORING
NO.	FEET	S3HONI-9	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
5-4 Reference	15'-17'	1/2/3/3	3.0	15-151: Dark grey fine gr Aand Low Mastricty, very LCC & Olamp (SP) 15.1 10 17.0: Lt grey siety clay Orange mettling. Hi plasticity, moist. Lost 4" are saturated. pH-6 CL	Reference	-4 -4	29
5 08902020	20-22'	:2/3/5 /G	2.0 2.0	*charag at 15.1 tt. grey siety clay Heavy motiling and organies. Ni planticity, love, moist. Top 3" semi-saturated * perched water zone at 15:6 to 20.3'	- 5-4. Analy H.	<u>- 4</u> - 4	
5-6 Reference	25 - 82 0' 27	5/6/7/8	વા વ	Dark grey sulty clay. Med. plenticity, loose, moist. Trace organics and angular gravel prices. 2 med. grained tax well sented sand lens. (se/er) pH-6 * change at 29' (approx) from clay to sand	Reference sar:ple	-9-1-4	

FIELD BORING	LOG	BORING N	BORING NO. CPB2922			
PROJECT NO.: 6049- 0	Y PROJECT NAME:	USATNAMA- BA	AP.		PAGE 3	3 OF 4
DRILLING CONTRACTOR:	MATHES	DRILLER: Ed	Clack	DATE STARTED /0-	14-89	COMPLETED 16-14-
METHOD: HSA	CASING SIZE: 4,24	510	TIP eV: 16.6	PROTECTIO	M LEVEL: 1	Ned D
GROUND ELEV.:	SOIL DRILLED:	G' WATE	R LEVEL: Lin	2 TOTAL DEF	TH: 66	, /
LOGGED BY: D.LaRiu	CHECKED BY	: P. Bolme	DATE:	11/20/84		

SAMPLE	DEPTH IN	BLOWS PER	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	HONI	TORII
NO.	FEET	6-INCHES	REC.	pescalfila	75 772102 01 50.1110	TIP	LEL
5-7 Reference	30'- 32'	9/17/24/25	<u>a 0</u> a.o	Jan, med to fine grained clean sand . Mattild no plaiticity, med dense, damp to dry Irace heavy numeral, and trace angular gravel pH-6 (SP)	Reference	-4	2/
5-8 Reference	40-42'	9 zı z+ 40 *	30	Hed brown to tun fune to Hed brown to tun fune to Hed go sand Moteled with some organics No plasticity, dense, damp. (SP) pH-6	Reference	<u>-4</u> -4	
5-9 Reference	50'-5a'	10 17 19 21	ର ଜାବ ଜାବ	Tan, med to fine grained clean something hand. Orange matching Poorly sorted, no plasticity, medium aense dansp. Some med brown sandy set lens. Located above orange matched area (SW) pH-6	Reference	<u>-4</u> -4	
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BORING NO. CPRSGCA FIELD BORING LOG POJECT NO.: 6049- 04 PROJECT NAME: USATHAMA- BAAP PAGE 4/ of 4 DRILLER: Ed. Claik COMPLETED 15/14/59 TILLING CONTRACTOR: MATHES DATE STARTED 10.14.89 PROTECTION LEVEL: ALCO D METHOD: #5A CASING SIZE: TIP eV: 4.25 ID 10.6 SOIL DRILLED: 66 WATER LEVEL: Notice TOTAL DEPTH: GROUND ELEV.: CHECKED BY: P. Bolmer DATE: 11/20/89 LOGGED BY: D. La Rue

SAMPLE	DEPTH IN			DECEMENTAL	COMMENTS ON	MONITORIA		
NO.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL	
5-10 reference	60'-62'	10/13/16/17	3.0	Tan to recourt hower medium to sine go sand. will hosted hon plastic, much cientity, damp to ciry. (SP) 61-61.5 Med brown handy gravel laws. Gravel hamp to dry. (GM) 615-62: Tan, med go clean gravely hand. No plas, Poorly hosted, damp to dry. A few very clean med go hand lens. Very well hosted. (GM) pH-6	Reference	-4-	-	
5-11 18902064	64'-66'	9/20/50/105	<u> </u>	Med brown sandy gravel. Poorly sorted Teense, damp to moist. The gravel. Unable to drill thru. pn-6 (GW) - T.D @ 66.0'	5-5 Aralytical	- 4		
		·						

FIELD BORING LOG BORING NO. CP8-89-13 PROJECT NO.: 6049- 04 PROJECT NAME: USATHAMA- BAAP PAGE / DRILLING CONTRACTOR: MATHES DRILLER: Ed Clark DATE STARTED 10-12-89 COMPLETED /C/13/54 METHOD: HSA CASING SIZE: 4.25 TD TIP ev: 10.6 PROTECTION LEVEL: MCCI. D GROUND ELEV.: 77.8' WATER LEVEL: NA SOIL DRILLED: TOTAL DEPTH: LOGGED BY: CHECKED BY: P. C. . Laffre DATE:

SAMPLE NO.	DEPTH IN	BLOWS PER 23KJKI-6	PEN		CCMMENTS ON	MON	ITGRING
		O TACILES	REC	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
3-1 0890300	0-31	1/2/3/4	20	Dh brown sit with numo amounts of very fine sained Haci plasticity, loose, fourly moist. Some mottling (SM) pH-6	5-1 And taken No travole advancing	47	21.6
5-7 08903005	5-7'	3/7/11/15	3 .9	tchange at 2.0 Lt grey with crange mothling clayey silt. Moderate plosh-city, medium clense. Microst (c. tomic) pH-5	5-2 Anall takin No problems	0-3	
5-3 08905010	10'-12'	2/2/3	1.5	tenange at 10.0 Lt brown, medium to fine gr. sand with trace sitt well sorted. Some mottling Non- Plastic, I cose, damp (SP) pH-6	5-3 Amas takin	3 12	- -
3-4 reference sample	15'-17'	3/4/5/6		Tan to nuclium brown, med to fine grained sand. Trace sit. Well sorted. Hottled lorange). Non-plastic, loose, clry to damp. PH 6 (SP)	Reference sample	نداره	
5-5 1903020	20'-22'	3/4 3 8	3.0 3.0	Lt. brown to orange, medium to fine grained sand. selty-clay lens at 21.0 to 21.5'. Trace sit. Well sorted. Some mottling. Non plastic, Loose, damp. pt - 6 (SP)	s-4 Anal-taken smooth. anilling	·5/-5	

^{*}Tip reactings taken with background

BORING NO. OPBEFFO3 FIELD BORING LOG PAGE 2 OF 4 ECT NO.: 6049- 04 PROJECT NAME: USATHAMA- BAAP DATE STARTED 10 12 89 COMPLETED 10 12 35 LING CONTRACTOR: MATHES DRILLER: LICLIFULS PROTECTION LEVEL: MCO D TIP ev: 10.6 CASING SIZE: 4 25 ID METHOD: HSA TOTAL DEPTH: 726 SOIL DRILLED: 77.8' WATER LEVEL: NA GROUND ELEV.: CHECKED BY: P. Balmer DATE: LOGGED BY: O. La Rue 10/14/89

SAMPLE		BLOWS PER	PEN.	DESCRIPTION .	COMMENTS ON	MONITORING		
i NO.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL	
5-6 Reference	25'-27'	2/5/5/7	7.0	Tan, med to fine grained ciean sand well sorted Non-plastic, loose, damp Traces of neavy numeral (hornblend?) PH-6 rad-0 (5P)	Reference taken	-5 -5	210	
s-7 Reference	30'-32'	4 5 5 5	3.0	Med to dark brown, med go. Clean sand Mod to well sorted Non plastic, loose, (si) damp Traces of neavy min. At: 31.5', enter into a dark brown silty clay with a gravel lens on top. Mod to good plasticity, loose, suturated. *change at 31.5'. * Perched water 3 cne at 31.5'	Reference sample. Perched water zone at 31.5	5/5		
5-8 Reference	32'- 34 [']	8/16/15/15	1.8	Lt. brown sit. Lo plasticity, medium dense, danip to mast. Tan, fine to med gr. sand lens at 32.2' to 32.3' and 33.2 to 33.3'. Well sorted, damp. Some mothling (mi/cl) pH-7 rad o	Reference Scinple	-5-5		
S-9 Reference	40'- 4Z'	9/10/10/15	3)30	med brown, medium to fine grained sand with trace of silt. Well soited. Non-plastic, med dense, damp Crganic layers (znom thick) at several intervals in sample slight mottling. V fine sand lins@ 41.8 (5"thick) pH-7 (SP)	Reference sample	-51-5		

BORING NO. CABSID3 FIELD BORING LOG PROJECT NO .: 6049- 04 PROJECT NAME: USATHAMA- BAAP PAGE 3 OF 4 DRILLING CONTRACTOR: MATHES DRILLER: Ec. Clark DATE STARTED 10 13 59 COMPLETED 10/2 5 TIP ev: 10.6 CASING SIZE: 4.25 ID METHOD: HSA PROTECTION LEVEL: FICC D SOIL DRILLED: 77.6 GROUND ELEV.: WATER LEVEL: NA TOTAL DEPTH: LOGGED BY: O. LaRue CHECKED BY: P. Balmer DATE: 16/14/59

SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONI	TORIN
	_		REC.	J. J. J. J. J. J. J. J. J. J. J. J. J. J	ADVANCE OF BOXING	TIP	LEL
5-10 Reference	50'-52'	13/15/18/19	3 1 2	Tan to med. brown, meaning grained scano. Trace of solt. Moderate to well scoted, non plastic, meaning sano and solt lens. Sand lens are med. gr. well scoted, non plastic clamp pH-6 (SP) *small perched water some at 40' to 50'. Well scaturated sandy solt, dark brown, mod. plasticity. *another small perched water zone at sol-os'	Reference Sample	-015	
5-11 Eference	60-62'	14/23/37/48	a so	60.0 to 60.2: Med. brown med. gr. sand with gravel layer at base. Non-plastic dense dry to mast. (SP) 60.0 to 61.0: Tan, med. gr. ellan sand, well sonted. Non plastic, alense dry. Traces hornblende. (SP) 610-62.0: Tan, med. grained clian, gravelly sand. Pour sonting. Mottling top 1. No plasticity. Grades to finer grained sand to was. Dry to mast. (SP) pH-6	Reference sample		

BORING NO. OPESSO 3 FIELD BORING LOG PAGE 4 OF 4 HECT NO.: 6049- 04 PROJECT NAME: USATHAMA- BAAP DRILLER: ECI Cicik DATE STARTED IC IZ 84 COMPLETED 10 12 54 DATLLING CONTRACTOR: MATHES METHOD: HSA PROTECTION LEVEL: Mod. D TIP eV: 10.6 casing size: 4.25 FD SOIL DRILLED: 778 NA TOTAL DEPTH: 17.8 GROUND ELEV.: WATER LEVEL: CHECKED BY: P. Balme LOGGED BY: D. Le Rue DATE: 10/14/59

SAMPLE NO.	DEPTH IN	BLOWS PER	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONI	TORING
NO.	FEET	6-INCHES	REC.			TIP	LEL
5.12	70'-72	8/17/15/27	7.0	Tan, med cpained gravelly sand. N'accerate to party sand. Mattled Non plastic dense, clamp 70.5 to 72.0: med brown sold mottled, moderate plosti- aty, med along. Mast to semi saturatea. (Mid) ph - 7.0 *change at 70.5 *small perched water some at 70.5		- 5	<i>⊋1.</i> €
5-13	77 '-78'	61/stopped		Sandy gravel (tam) for .5', then tan shale bedrock. Try. (GP) pH-8 *Hit bedrock at 77.6. Stopped drilling.	Drilling aifficult		
				B.O.B. € 728'			

FIELD BORING	i l.OG			BORING N	10. opb	8904
PROJECT NO.: 6049-	PROJECT NAME:	USATHAMA- BAA	Ρ		PAGE /	OF 6
DRILLING CONTRACTOR:	MATHES	DRILLER: EO	Clark	DATE STARTED 10	13 89	COMPLETED 10 13.69
METHOO: HSA	CASING SIZE: 4.	5 TO	TIP eV: 10.	6 PROTECTIO	ON LEVEL: M	cd. D
GROUND ELEV.:	SOIL DRILLED: 97	UATER	LEVEL: 93,	3 TOTAL DEF	TH: 97.0	
LOGGED BY: O. Lafue	CHECKED BY	1: P. Bolmer	DATE:	10/14/89		

SAMPLE NO.	DEPTH IN	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONI	TORING
NO.	7627	0-INChES	REC.		ADVANCE OF BORING	TIP	LEL
S-1 08904000	0-2'	4/3	1.5	Med brown sandy site Poorly sorted. Low plasticity, lower, damp to morst. Roots, mottled. (ML/CL) pH-6	5-1 Analytical	-4	<i>a</i> / c
5-Z 08404005	5-7.	2/4/6/7	2.0	H. brown to et grey with orange mottling suity elay. Trace organics howdensity high plasticity, moist. (mi/ci) pH-6	5-2 Analytical	- Z -1.5	
5 - 3 0890 4010	10'-12'	2/9/7/8	<u>2.0</u> 1.9	Hely elay. Trace organies. Low density, mod. plasticity, moist (ML/CL)	5-3 Analytical	- 3	
				orange brown (non stained) med to fire gr. Lety sand. Mod sorting, low density, damp. hayer of gravel at love. () 11.3 to 12.0 Tan to et grey Lety elay. Moduate to hi plasticity, moist. (SH) pH -6			
S-4 Reference	15'-17'	6/15/20/38	क्षेत्र	*change at 11.0 } PID kick *change at 11.3 } PID kick 150 to 15.5 med. brown with enange motiling, med. to fine go. send. moderate sorting, med. dense to clinse, damp to moist. (SP) ever next page	Reference sample	<u>-3</u>	

FIELD BORING	LOG	В	BORING NO. TE-SEL				
COJECT NO.: 6049- CH	PROJECT NAME:	USATHAMA- BAAP		,	PAGE 2 OF 5		
LLING CONTRACTOR: M	LATHES	DRILLER: Ed Cia	nt DATE S	TARTED 13-13-6	COMPLETED 10:3 45		
METHOO: 454	CASING SIZE: 4 🚄	5 1D TIP (iv: 10.6	PROTECTION LEV	rec: Next. D.		
GROUND ELEV.:	SOIL DRILLED: 97	WATER LEVE	: 93.3'	TOTAL DEPTH:	97.0'		
LOGGED BY: O. La Rue	CHECKED 8	: P. Brisare	DATE: 10/14	159			

SAMPLE NO.	DEPTH IN	BLOWS PER	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	HONI	TORING
AU.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BOXING	TIP	LEL
S-4 continued				15 5-17.0 Med brown rely rand. Pour sorting, monst mothed. Trace organies (SH) pH-6	Reference		
5-5 08904020	20-22	10/20/25/40	Z.C	20.0 to 20.5 Med. brown rully rand. Pour sorling, no plasticity. dense, clamp. ISM) 20.5 to 22.0 Tan. med. to fine grained Clan sand. Well sorted. no plasticity, damp. (SP) * Color at 21.7 is med. brown	5-4 Analytical Sample	- <u>13</u>	
S-6 Reference	25- [*] 27'	7/13/21/22	790 790	well sorted, sono plasticity modulate density, damp. Gravel layer at 26.0 (1"	Reference	373	
				thick). 26.0 to 27.0 Same type sand; to size decreases to fine grained. Clean, damp, no plasticity. Centains small set lens' med brown in celon. (SP) pH-6	(

FIELD BORING	LOG			BORING NO. OPBESCH			
PROJECT NO.: 6049-C	PROJECT NAME:	USATHAMA- BA	AP		PAGE	3 OF	5
DRILLING CONTRACTOR:	MATHES	DRILLER: &	d Clark	DATE STARTED /C-1	3-29	COMPLETED	10 13-4
METHOD: 454	CASING SIZE: 4.2	5 I O.	TIP ev: /0.6	PROTECTION	LEVEL:	NECL D	
GROUND ELEV.:	SOIL DRILLED: 9	? C' WATE	R LEVEL: 93.3	TOTAL DEPT	H: 9	7.0	
LOGGED BY: O. La Rue	CHECKED B	r: P. Bolne	DATE:	10/14/89			

SAMPLE	DEPTH IN	BLOWS PER	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	HONI	TORING
NO.	FEET	6-INCHES	REC.	DESCRIPTION	AD VANCE OF BOX 1.10	TIP	LEL
S-7 Reference	30'-32'	10/25/33/42	20	Tan, med to fine of sund. Guein, dense, no plasticity, dense, no plasticity, dense, 31.5 is med of sun traces of gravel at 30.7' some matching. (SP) pH-6		- 3	
5-8			}				
Reference	40-42'	12/25/24/30	3.0 3.0	40.0 to 41.0 Tan, med to fune of sand. Clean, dense, no plasticity, demp. Gravel layer at boue. (SP) 41.0 to 41.5 Tan, reity sand. mod. Acting, no plasticity, semi. Activated. (SM) 61.5 to 42.0 Mid. brown, med- to large grained sand. Sub-argular to sub-rounded grains, No plasticity, damp (SP) * Amale perched zone at 41.0	Sample	3 3	
5-9 Reference	50'-52'	8/40/42/37	9.3 1.3	50.0 to 50.5 Tan, med-gr hand, weel. Acted, damp, no plasticity, dense. (SM) to 51.0: orange, handy gravel pour sorling, damp. to 52.0: Tan sandy gravel. Damp but it	Reference Aample	-3 -3	

BORING NO. 1782454 FIELD BORING LOG PAGE 4 DIECT NO.: 6049- 64 PROJECT NAME: USATHAMA- BAAP OF 5 DATE STARTED 10-13-09 COMPLETED 10-13 20 ILLING CONTRACTOR: MATHES DRILLER: -d Clark PROTECTION LEVEL: Modi D TIP ev: /0.6 METHOD: H'SA CASING SIZE: 4.25/0 WATER LEVEL: 93.3 TOTAL DEPTH: 97.0' SOIL DRILLED: 970' GROUND ELEV.: CHECKED BY: P. Bolmer LOGGED BY: D La Rue DATE: 16/14/59

SAMPLE	DEPTH IN	BLOWS PER	PEN.	neers (ny lou	COMMENTS ON	MONI	TCRING
NO.	FEET	6-INCHES	REC.	DESCRÍPTION	ADVANCE OF BORING	TIP	LEL
5-10 08904060	60-62'	7/20/23/22	<u>a.o</u> a.o	tehange at 50.5 Tan, med on sand with trace growel moderate sorting, dense, no plasticity. Saturated (SP)	5-5 Analy head	-4	
5-11 Corene	65'-67'	10/27/96/53	Z-0 1.3	* percheci water zone from 60.0' to 66.0' 65.0 to 66.0 Med. brown sulty sand, your grained. Trace funes. Slightly mothed. To no plasticity, dense, saturated. Gravel layer at 65.8 to 66.0 66.0 to 67.0 Tan, med. qn. gravely	Reference	<u>-4</u> -4	
5-12 Reference	15-77'	13/25/3>/39	<u>z.o</u> 1.3	Mand Poor sorting dense, damp (SW) pH-6 *charge at 66.0 Med. brown, med. op. Sand. Traces of gravel. Well Merted, dense, no plasticity, damp to moist. Traces heavy mineral. Alternating med. op. sand with fine op. sand lens: (SP/SW)	Reference	-4-	

FIELD BORING	LOG			BORIN	IG NO	י פינט	3 99	04	
PROJECT NO.: 6049- 04	PROJECT NAME:	USATHAMA- BAA	IP.	······································		PAGE	5	OF	5
DRILLING CONTRACTOR: N	MATHES	DRILLER: どん	Clark	DATE STARTED	10-13-	જે9	COM	PLETE!	10-13-1
METHOD: HSA	CASING SIZE: 4 .2	5 1D	TIP ev: /0.	6 PRO	TECTION L	EVEL:	recel	'. D	
GROUND ELEV.:	SOIL DRILLED: 92	O WATER	LEVEL: 93.3	7 101.	AL DEPTH:	9	20'		
LOGGED BY: D. La Buc	CHECKED BY	· P. Bolm	ر DATE:	10/14/59					

SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONI	TORIN.
	145.		REC.	J. J. J. J. J. J. J. J. J. J. J. J. J. J	- STANGE OF BOXING	TIP	LEL
S-13 Reference	85'-8T	14/27/36/45	<u>2.0</u> 1.5	BECTORIO Med brown, med on sand with traces of gracel will sorted, aunse, no plasticity. damp to monst.		-4	
				med brown, sulty sund with tan, med qu. sand lens. Poorly surted, damp, lo plasticity. Mothers from 85.0 to 86.0. PH-6 (SP/SM)			
5-14 \$904095	95'-97'	15/32/40/62	2.0	95.0 to 96.0 Med. brown to tam, med. gr. sand. well sorted Dense, no plasticity, moist, trace heavy mineral. Sp	5-6 Analytical Sample	<u>+</u>	
			-	96.0 to 96.5 Tan, func qu. selty Dand. Moist to sumi saturated. 96.5 to 97.0 Med. brown gravelly sand			
				(angular gravel). Poorly sorted, dense, no plosticity. Saturated. Sandy gravel at 97.0'. GM + change at 96.0 + water at 93.3'			
				T.D. @ 97.0			

water level may be affected by Aupage from purched zones above.

BORING NO. OPE-5 905 FIELD BORING LOG JECT NO.: 6049-04 PROJECT NAME: USATHAMA- BAAP DRILLER: Ed Clark DRILLING CONTRACTOR: MATHES DATE STARTED 10 15 89 COMPLETED IC/10/97 CASING SIZE: 4.25 10 PROTECTION LEVEL: 1200 D METHOD: HSA TIP eV: 10 6 GROUND ELEV.: SOIL DRILLED: 95.5 45.5 TOTAL DEPTH: WATER LEVEL: NOTE CHECKED BY: P. Bolover LOGGED BY: D. LaRue DATE: 11/20/89

SAMPLE NO.	DEPTH IN	BLOWS PER	PEN.	BESCO LOTTON	COMMENTS ON	MONI	TORING
	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
5-1 08905ccc	c -2	1/2/3/5	1.8	Dark brown sancly self. Poorly serted, modificate plassicity, loose, damp Roots Grades to med. Lrown selty sand well serted, no plasticity, damp. (SM) pH-6	s-1 Analy tical	-3	<i>a</i> /
5 - Z 0 1905005	5-7	3/4/4/3	<u>2.0</u> 1.3	Top 7"- Dark (rown med. to jure gr. sand. Med. scring, no plasticity, Love, damp (SP) pH-6	5-2 Analytical	-3	
5-3 08905010	10 - 1Z	2/4/4	1.1	Alternating lens of med. Lrown to tan, med to for of sand well sorted, no planticity, loose, damp to dry. Contains dk brown sandy set lens! Med. plasticity, damp. Gravely set lens at 11.5: pH-6	S-3 Analytical	- 3	
5-4 Reference	15-17'	246/10	7.0	Top 5" med brown sulty hand alternating with med brown handly keet. (Mostly hand) Poorly socied, no planticity, Loole, dance (SM)			

FIELD BORING	G LOG	BORING NO. CFE-8905					
PROJECT NO.: 6049-	C4 PROJECT NAME:	USATHAMA- BAAF)			PAGE 2	OF 5
DRILLING CONTRACTOR:	MATHES	DRILLER: Ed	Clark	DATE STA	RTED 10-15-2	39 cc	MPLETED 1016 89
METHOD: HSA	CASING SIZE: 4.5	05 ID	TIP eV: /0.0	ر دو	PROTECTION LE	VEL: Mac	d D
GROUND ELEV.:	SULL DRILLED: 95	. 5 WATER	LEVEL: NOX	e_	TOTAL DEPTH:	95.5	
LOGGED BY: D. La	Rue CHECKED BY	: P. Bolme	DATE:	11/20/8	÷4		

SAMPLE	DEPTH IN BLOWS PER		PEN.		COMMENTS ON	MONITORIN	
NO.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
5-4 CON+.				a tan, med gr. gravely sand Poorly sarted, looks clamp. Gravel looks clike till (sw) pH-6			2/
5-5 08905020	20-22	5/8/13/13	2.0	Alternating layers: of med. Alternating layers: of med. Alour, fire on gravelly and, Poorly sorted, no Plas, mod. dense, dry, with tan, med on clean land. will sorted. To Plasticity, dry, with med. brown forangish sendy wet lens. mod. to good plasticity, dans. (sw/sm) pH-6	5-4 Amalytical	-4 -2.9	
5-6 Reference	25-27	3/4/6/8	a) a	Tan, med to fire grained clean hand. will sorted no planticity, looke, dry. Trace of gravel thrucus. (25.4 to 25.5 - med. brown handy wit lens. Lo plas, damp.) Trace of suveral other small suit lens. (5P) pH-6	Reference	<u>-4</u> -3.2	

BORING NO. 0P8-39-05 FIELD BORING LOG 3 of 5 PAGE JECT NO.: 6049- 04 PROJECT NAME: USATHAMA- BAAP DRILLER: Ed Clark DATE STARTED 10-15.89 COMPLETED 10-15 89 URILLING CONTRACTOR: MATHES PROTECTION LEVEL: Mod D CASING SIZE: 4.25" TIP eV: 10.6 METHOD: HSA SOIL DRILLED: 95.5' WATER LEVEL: ATL TOTAL DEPTH: 95.5 GROUND ELEV.: LOGGED BY: D. LaRue CHECKED BY: DATE:

SAMPLE	DEPTH IN	BLOWS PER	PEN.	PC 200 107 104	COMMENTS ON	MONI	TCRING
NO.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
5-7 Reference	30-32	4/5/8/11	30	Tan. med to fine graved land, trace gravel 'now serting, no plasticity. Loose to medicin dense dry. I from 30-31 gravel lize is "3mm. From 31-31.6, gravel lize decreases to lg. or land. From 31.6-32-gravel Nize increases significantly to ~1/2". pH-6 (Cultsu) *change between 32.940'	Reference	-4 -3.4	
5-8 Reference	40 -42'	7/11/15/19		Tan, med. gr. Clean sard. med. sorting, no plan., med. across, dry. Trace Mit lens (med. brown) (SP) Trace heavy minual pH-6	Reference	-4 -4	
5-9 Reference	50'-52	7/11/20/SC		Tan, med op. Elean sand, med. Norted, med dense, no plasticity, dry. Lite mottling at 51.5'. Gravel layer at 51.5. To 52: med. brown hity clay. Mod. plasticity, damp. pH-6 + Change at 51.5'. (SPIML	Reference	-4 -4	

FIELD	BORIN	G LOG		BORING	NO.	TB\$ 405			
PROJECT NO	.: 6049-	04 PROJECT	NAME: USATHAM	A- BAAP			PAGE	4 of 5	
DRILLING CO	ONTRACTOR:	MATHES	DRILLER	: Ed Ce	ark	DATE STARTED	0.15.84	COMPLETED /	16 8
METHOD:	HSA	CASING SIZE:	4.25 ID	TIP e	N: 10.4	PROTEC	TION LEVEL:	HOO D	
GROUND ELEV	/ . :	SOIL DRILLED	: 95.5	WATER LEVEL	: NOW	C TOTAL	DEPTH: 9	5.5	
LOGGED BY:	D.La	Rue CHE	CKED BY: P. BE	Imer	DATE: //	20/89			:

SAMPLE NO.	DEPTH IN	BLOWS PER	PEN.	DESCRIPTION	COMMENTS ON	MON I	TORIN
			REC.		ADVANCE OF BORING	TIP	LEL
5-10 Reference	60-62	7/16/18/35	3.0	Tan, med go clean sand. Well horted, non plastic, dense, dry Last 6" see mattling (arange) (SP) pH-7		-4	۵1
5-11 Reference	70-72	9/24/29/38	2)0 0	Tax, med. to fire gr. clean rand. Hell sorted non plastic, dense, dry. some matching. * Last I've remembat finer grained and more dense than first foot. (SP) pH-6		<u>-4</u> -4	
5-12 Experience	80 ⁻ -82	14/38/62/ 1 1		Top 5". Tan, randy gravel (~'6'). Poorly rotted, no planticity, dense, dry. 80.5 to 81.5. Tan, clean med. gr. rand. well sorted no plan, dry. Motiling to 82.0: Tan, ned. gr. gravely rand. Poorly rotted. There, no plan. dry. 60 pH-6	Reference	-4 -4	
					~.		

BORING NO. CPBE965 FIELD BORING LOG JECT NO.: 6049- C4 PROJECT NAME: USATHAMA- BAAP PAGE 5 .0F 5 DRILLING CONTRACTOR: MATHES DRILLER: EO CLORK DATE STARTED 10.15 89 COMPLETED PROTECTION LEVEL: LICA D METHOD: HSA CASING SIZE: 4.25 ID TIP eV: 10 6 WATER LEVEL: None 95.5 GROUND ELEV.: SOIL DRILLED: 95.5 TOTAL DEPTH: CHECKED BY: P. Bolo LOGGED BY: D. La Rue DATE:

SAMPLE NO.	DEPTH IN	BLOWS PER	PEN.		COMMENTS ON	MONI	TORING
ло. 	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
5-13 Reference	90-92'	141/43	2.0	Tan sandy gracel with deminant sanditore. Some till Very clene. dry. pH-E 59	Revience sangle Drilling difficult	-4	21
5-14- Reference	95-95.5	13z -stop	O	Spoon refural. Nothing un sample met few quantzite chunks.	Reference Lample. Tup of spoor cracked.		
			_	T.D. 95.5			
						·	
			- 1				

FIELD BORING	LOG	•	BORI	NG NO. OPT	3-89-
PROJECT NO.: 6049- 0	Y PROJECT NAME:	USATHANA- BAAP		PAGE	/ OF /
ORILLING CONTRACTOR:	MATHES	DRILLER: Ed. Clari	L DATE START	10/26/69	COMPLETED 10/26
METHOD: AUGUS	CASING SIZE: 4 /	"ID TIP ev: 4	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	ROTECTION LEVEL:	, , , , , , , , , , , , , , , , , , , ,
GROUND ELEV-	SOIL DRILLED: 15	St. WATER LEVEL:		OTAL DEPTH: 75	
LOGGED BY: BUSS	CHECKED B	r: P. Bolmer	DATE: 11/20/89		

SAMPLE NO.	DEPTH IN	BLOWS PER	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONI	TORING
	PEET	6-INCHES	REC.	DESCRIPTION	Advance or southly	TIP	LEL
				boring advanced 35t into dense boulders, relocate after resusal. Ivill 3 addl St. resusal again, relocate ~25' east, resusal at 25t. 85t of drilling before setting up on Sinal.	difficult drilling in boulders		
S#/	0-2	6 ₇	¥/24	Black organic over med Sine Sand wit/grave/cobbles and sitt-	difficult drilling in	5kg.	,
S*2	2-5	6 ₃₆ 10 32	6/ 24	Brown to Back Med-Sn Sand wit gravel cobbles and sit layers sa	boulders.	Ekyd.	
S * 3	5-7	8 14 ₁₅ 16	3/24	Brown to gray med-5n SAND of cree Sand and gravel + cobbles. FILL 89 754 EOB	,	·	

Total sootage For this boring = 7+2+3+3=1554

FIELD BORING L	OG		BORING NO. OPB-89-07			
COJECT NO.: 60494	PROJECT NAME:	USATHAHA- BA	AP		PAGE ; OF	
ILLING CONTRACTOR: MA	HES	DRILLER: E.	d Clark	DATE ST	ARTED 10/25 COMPLETED 10/25	
NETHOD: HUNGEYS C	SING SIZE: 식성	I VID	TIP eV: #//	10.6	PROTECTION LEVEL:	
	OIL DRILLED: 12	ST WATE	R LEVEL:		TOTAL DEPTH: 1254	
OGGED BY: Russ	CHECKED B	r: P Bolme	DATE:	11/245	37	

SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6-INCHES	PEN.	RECEIPTION	COMMENTS ON ADVANCE OF BORING	MONI	TORING
		1	REC.	DESCRIPTION	ADVANCE OF BOXING	TIP	LEL
S#1		8 ₂₁ 26 3i		Black to brown fr-crse SAND with sitt + grave FILL Sop Cobble in tip of spoon, boulder at 3 St. rig pulled, sorwar ~ 3 St for 2 matternst.	difficult drilling with many boulders.	Bkgd.	
	5-7	24 23.47 39	8/24	Brown Crse-In SAND wt/gravel some sitt. FILL dry Sp		Bkg√	
S*3	10-12	16 46 63 ₆₆	18/24	Brown to gravy «rse-med SAND with grave I FILL Dry.	•	ekgl	,
				12 5t. BoE			
			·				

FIELD BORING	LOG	BOR	BORING NO. OPB-89-08				
PROJECT NO.: 6049- C	PROJECT NAME:	USATKANA- BAA	P		PAGE	_ / OF /	
DRILLING CONTRACTOR:	MATHES	DRILLER:	1. Clark	DATE START	ED 10/26	COMPLETED 10/26	
METHOD: Augers	CASING SIZE: 4/4	"ID	119 eV: #//	10.6	ROTECTION LEVEL:	ク	
GROUND ELEVA	SOIL DRILLED: 9	O' WATER	LEVEL: No.	re 1	OTAL DEPTH:	9.0'	
LOGGED BY: BUSS	CHECKED 8	r: P. Bolme	DATE:	11/20/84			

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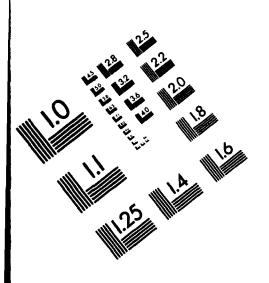
• ;

SAPLE	DEPTH IN	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MON1.	TOR 1 K
NO.	FEET		REC.	DESCRIPTION	ADVANCE OF BOXING	TIP	LEL
S#1	0-2	675	134 24	Brown Crse-Sine SAND wt/gravel, FILL moist		3kg	/
S#2	5-7	13 17 24 .25	18/ 29	light brown Crse-Fine SAND wt/gravel, Fill. dry-moist SP	·	Bkgi	
S#3	7-9	32_ 60 100	18"	oily order in casing, Tip = 15 up to 6 ppm 0.9=Bkgdi = brown mad-In SAND wit little sitt and some gravel dry TIPE Bkgd 59	*	Bky.	, /.
·					•		
					^		

FIELD BORING	_og	BORING NO. 003 -85-10			
ct NO.: 6049- 04	PROJECT NAME:	USATHAMA- BAAP	PAGE (OF ,		
DRILLING CONTRACTOR: MA	ATHES	DRILLER: GO CLANK	DATE STARTED LO -26-89 COMPLETED 10-26-89		
METHOD: HSA	ASING SIZE: 4	"10 TIP eV: 10.03	e U PROTECTION LEVEL: D		
GROUND ELEV.:	SOIL DRILLED:	9' WATER LEVEL: NA	TOTAL DEPTH: G'		
LOGGED BY: NOSG	CHECKED B	7: P. Bolmer DATE: 11	20/89		

SAMPLE NO.	DEPTH IN		PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONITORING		
NO.	PEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BOXING	TIP	LEL	
5-1	0,-5,	3 4 12 27	14/24	Brows Sity V.F. SAMO. ORGANIS AT TOO - MOUST. SM		යිනිව		
 S-2 	22,	g4 8 11	- <u>}</u> \	TROW CORRSE. E. JAND PARO W GRAVIL DIV. MOIST SW	·	3€ 0		
£-2	7-9	18 37 12	18 4 18 4	BROWN CORNET . F. SAND LI/ GUNVEL DAY-MOIST SW		13600		
				<i>6.</i> 600				
					~			

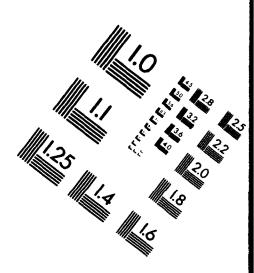
AD-A280 436 REMEDIAL INVESTIGATION BADGER ARMY AMMUNITION PLANT BARABOO WISCONSIN VOLUME 1 APPENDICES A THROUGH D(U) ABB ENVIRONMENTAL PORTLAND ME 1991 XA-USATHAMA UNCLASSIFIED DARALS-91-D-0008 8/9 NL

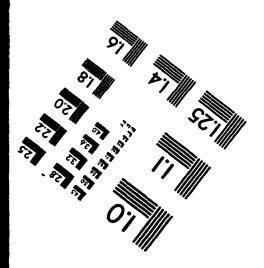




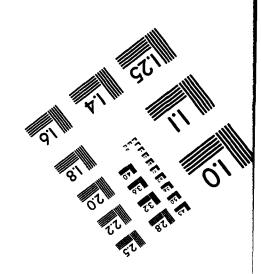
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FIELD BORIN	G LOG		. ВО	BORING NO. 0PB-89-11					
PROJECT NO.: 6049-	SEL PR	OJECT NAME:	USATHAMA- BA	AP			PAGE	[. OF /	
DRILLING CONTRACTOR:	MATHES		DRILLER: E	delark	DATE ST	ARTED 10/2	b	COMPLETED /	1/26
METHOD: Augusts	CASING S	125: 4 1/4		TIP eV: # //	10.6	PROTECTION L	EVEL: [>	
GROUND ELEV	SCIL DR	ILLED: 10.	5 WATE	R LEVEL: N	<i>i</i> A	TOTAL DEPTH:	10.	5	
LOGGED BY: Buss		CHECKED BY		DATE:	11/20/89	·			

SAMPLE NO.	DEPTH IN	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONI	TORING
			REC.			TIP	LEL
5#1	0-2	1446	12/	4" Tan sandard gravel, med Sill, over brown silty Clay with evse sand+ gravel dry-moist.	wy	BK.d	207
S#2	5-7	1136	19/24	Redish Brown sift Clay with little gravel + Sine sand. FILL moist-wet FILL MM-CL		BKgS	
<i>S</i> *3	p-10.5	100/5,		We sample recovery, oil odor, TIP= ~30 ppmattempt sample collection by removing bottom plug + scraping sidewals.		30 _{pf}	om.
•			18/24	brown sitty 5n-med same wtgrave, we at upper surface of spoon sp -TIP = 20 ppm VOA + Inorganic sample collected.	Spoont Auger Resusal at 10 St.	20 _P p	~
				co/lected.	<u>`</u>		

FIELD BORING	LOG	BORING NO. 88 0PB-89-12				
ECT NO.: 6049- C	4 PROJECT I	IAME: USATHANA-	BAAP		PAGE	/ OF /
DRILLING CONTRACTOR:	MATHES	DRILLER:	Ed. Clark	DATE STARTED 10/	5/89	COMPLETED 10/25
METHOD: Augrevs	CASING SIZE:	4.7" ID	TIP eV: # //	PROTECT ION		, , ,
GROUND ELEV.	SOIL DRILLED:		ATER LEVEL: NA	TOTAL DEPT	H: 135	7
LOGGED BY: BUSS	CHEC	ED BY: D R	DATE: /	1/20/89		
		Y. U.	ine 1	1/20101		

م <u>ب</u>

SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MON1	TORING
Strl	0-2	5745	24/24	Gray Silt, dry wit/ occasional crse Sand + Sn gravel, (loess, Sill?) sm	Bkgd= ~0.5pp	8ke_1	521
S#2	5-7	² 3 ₄ 4	24/ 24	Gray to brown silt and clay moist-wet some iron staining CL-ML LOESS	5	Blyd	
8#3	10-12	8 25 109	18/4	very rust colored Crose to med sand and gravel (angular) little Sine sand and sitt. SP-SM	·	BKL	
				EOB=135t, Auger resusal.			
		·					
				·	•		
					~		

BORING NO. 083-89-13 FIELD BORING LOG OF / PAGE PROJECT NO .: 6049- 64 PROJECT NAME: USATHAMA- BAAP COMPLETED 60-36-80 DATE STARTED LO -36-89 DRILLING CONTRACTOR: DRILLER: FO CLANK MATHES 44"10 TIP ev: 10.02 eV PROTECTION LEVEL: D METHOD: HSP CASING SIZE: WATER LEVEL: NA SOIL DRILLED: 20' TOTAL DEPTH: 7.0 GROUND ELEV .: CHECKED BY: P. Bol DATE: LOGGED BY: NSG 11/20/59

SAMPLE NO.	DEPTH IN	BLCWS PER 6-INCHES	PEN.	DESCRIPTION	CCMMENTS ON ADVANCE OF BORING	MONITORING		
RU.	FEET	0-14C152	REC.	Distance 1 a Off	WALLIAM AL BALLIAM	TIP	LEL	
S-I	o 3,	3445	מי מי	MOUN SILTY F, SAND TRE GRAPE MOIST GRASS ! ROOTS AT TOP GEST		BRES		
S-2	2-3,	6 16 17	13/24	INTERPORT TO THE CONTRET F SAND WI GRAVEL, TR SILT AND MED. F. BLACK SOMED - TAN SAND. MOIST - DRY SP		BKGO		
				B08 7'				
					·			
				·				
					,			

FIELD BORING	LOG			ВС	BORING NO. CAMBER- DI			
T NO.: 6049- 6	PROJECT NAME:	USATHAMA- BAA	P			PAGE \ OF (
ING CONTRACTOR:	MATHES	DRILLER: MA	ما، خبروس	DATE S	TARTED 11	S. COMPLETED 11/13/59		
METHOD: profession with	CASING SIZE: 9		TIP eV: こい	2V	PROTECTION	LEVEL: ()		
GROUND ELEV.:	SOIL DRILLED: 88	O' WATER	LEVEL: 66.8'		TOTAL DEPTH	: 85.0'		
LOGGED BY: NSC	CHECKED B	: P. Bolmer	DATE:	11/20/	89			

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SAMPLE NO.	DEPTH IN FEET	BLOWS PER	PEN.	 	COMMENTS ON	MONITORING	
L	PEEI	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
S - 1	0,-10,			BROWN SANDY SILT MOIST SM	11/1mm	מאנט	
S-2	10'-30'			BOWER - TAN SAND AND BILT, M. GRAVEL, BOUNDERS 92 47 14' AND 17' DAY 58	V /min	אונגם	
5.3	30' · 30'			TAN F. SAND F. MED SAND AND GRAVE, MESICE TROUPINGS AT 24 4 29, DAY 59	1 / an 1.5 mm	24	
	30 .40			TAN F-9AND AND CRAIRE TRE SILT, TOULDER! AT 34' DAY	1'/1.5 ~	NA	
	40.50			TAN F JAND & CRANCE M SICT BUSINGS AT 148' DAY SP	1/2~-	NA	
2.6	50 GC			SAME A) 3.5 BOUDER AT	11/2n-	NA	
5-7	60 65			GANG FRANCE SAND AND	1/2000	√ħ.	
5. B	65-70			GREY CRANEL CONSTRUCT SUNE SHALL THE OWNERSHIP	114~~~	MR	
S- 9	35-60 36-60			BREY-BACE COARSE SAND LY	Durso for	WA	
الماري	B)- BB.			CLEY SAWS LARRY BIRCH GRAFIC SIRE PIECE OF SHALL	11/5 no	MA	

FIELD BORING	LOG	BORING NO. OF FOR - CE				
PROJECT NO.: 6049- 04	PROJECT NAME:	USATHAMA- BAAR	•		PAGE	e of (
DRILLING CONTRACTOR:	MATHES	DRILLER: MA,	مع ا ليولم ا	DATE STA	RTED (1 - 7 . Se	COMPLETED (1- POPS
HETHOD: HARMER	CASING SIZE: 9'		TIP eV: دن ع	. V	PROTECTION LEVEL	
GROUND ELEV.:	SOIL DRILLED: 113	WATER	LEVEL: 97.6		TOTAL DEPTH:	(18
LOGGED BY: N56	CHECKED 8	Y: P. Bolmer	DATE:	11/20/89		

SAMPLE	DEPTH IN	BLOWS PER	PEN.	DESCRIPTION	COMMENTS ON	HONI	TORING
NO.	PEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
	0-10			BROWN UF SAND, SOME SICT, SOME CVAY, LOSSS MOUST - WET SM	1 / 25 mm	()==	
	10'-20'			CJEHIZH BUGAN ZALA CIYA	ADVANCED AMPROX		
	50.30,			TOURST SILTY VE SAND			
	30'-40'			CT BROWN SICTY VE SAWS			
	70°- 60	·		is the same charge some	1, /2 w'm		
	(eu`-80			some as assure som	5 1 € (mp		
	කි. ක.			17 TERCOLUS - TAM F. SAMS SUMS SICT SUMS CROUL WET SIM \$ ≈ 97.5	2 19 5/200		
	۱۱۵ - دن،			مرده مرده المرد المرد المرد المرد المرد المرد المرد المرد المرد المرد المرد المرد المرد المرد المرد المرد المرد			
	10 - 118			Man crant . suns 80 (ini person) Courseite Char (Bour (Arme))	2 1 Ft / 3 min		

FIELD	BORING	LOG			BORING NO. OPM-	39-0z	-
***	o.: 6049-04	PROJECT	NAME:	USATHAMA- BAAP		0F Z	
و عساد	CONTRACTOR: 8	MATHES		DRILLER: M. TINNIN DI	ATE STARTED 10/27/59 COMPL	ETED O	/\$
RETHOD: E	COTARY	CASING SIZE:	9	TIP eV:	PROTECTION LEVEL:		
ROUND ELE	IV.:	SOIL DRILLED:	ł	WATER LEVEL:	TOTAL DEPTH:		
OGGED BY:	D. BELA	CHEC	KED BY:	PATE: DI	JOD, 109		
				110 AD CO	11/0		
SAMPLE NO.	DEPTH IN	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING		CORING
	,		REC.	(204)		TIP	LEL
S*1	0-10			DK BROWN TOPSOIL, GI	rading to		
				Brown/GRAY SILT (LOESS	5), DRY-		
				DAMP, TO MET, WA			
				Brewn CLAY SOPT MOD PL	ASTIC W PL-CL		
				EITLE SMO, DRY OF	HIGHLY	BKG	
				PLASTIC, - DAMP-MOTS	T. CLEAN, CH-CL	BKD	
5#2	10 -20			GRAY CLAY MIGHLY	•	0.5 M	
3 ° C	10 - 20			DAMP, CLEAN , CL-CH		0.54	
#3	20-30		1	GRAY CLAY MEDIUM TO	PARK, MOD PLASTIC.		
_				DAMP, CLEAN, CL TO		1-	
		}	1	24-30 pc. MEDIUM BROW	N SAND, MEDIUM GRAINED,		
				resetted pense bookit	(GRADED , NO ODOR,		
				W/LITTLE GRAVEL, SP	FINE	+	
säty	30 -40			MEDIUM BROWN SAND, HT POORLY CRADED, NO ODOS	EDIUM, LOOSE - DEWSE,	1ppu	
				DRY-DAMP, SP	c, cc/21/12 song cadilec		
#5	40-50		40-	MEDIUM BROWN SAND, MED	NUM - VESONE COMESE NA	0	
7	10-35		42	SILTY, WELL GRADED , DAN		BKG	D .
			72- 45	SANDY CLAY, ST RASTIC	DANF-HOLET,	-	
	•			THE SILT CL W/L	ite Gravey	-} ∣	
			45-3C	LT BROWN SAND, MED	-V.FINE, FGRADED		
				MOIST-WET, NO ODOR, T			<u> </u>
£6	50-60			LT BROWN SAND, MED-	V. FINE, SOME SIU,	5550	
, •				MOIST-WET, WELL CRADE	D, NO OTOR SW]
#17	60-70			LT BROWN SMD, LED-U	FINE SOME SILT		<u> </u>
"	PU - 10			MOISTWET, WELL GRAD		BKGC	ł
			-	SW			 _
3#g	70-80			LT BROWN SAND, MED	· •	BK6	Ь
_				MOST-WET, WELLCRAY	DED, TRACE GRAVEL		
				AND CLAY, SW			

FIELD BORING	G LOG	BORING I	BORING NO.0A4 -89-02					
PROJECT NO.:	19-04 PROJECT NAME:	USATHAHA- BAAP		PAGE	2	0F Z		
DRILLING CONTRACTOR:	HATHES	DRILLER: M. TIND	IN DATE STARTED 10/	27/89	co	MPLETED 10/27/		
HETHOO: ROTHEY	CASING SIZE: 9	IN . TIP ev:	PROTECT 1	ON LEVEL:	D	•		
GROUND ELEV.:	SOIL DRILLED:	WATER LEVEL:	98 FT TOTAL DE	PTH:				
LOGGED BY: D. BE	CHECKED BY	Y:	DATE:					

SAMPLE DEPTH IN BLOWS PER 6-INCHES		PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONI	TORING	
	REC.			TIP	LEL		
3 ⁴ 9	80-90			LT. BROWN SAND, MEDIUM -V FINE, S MOIST-WET, WELLGRAPED, SOMEGRAU Q 84-85 FT, TRACE FINE GRAVEL THE SW		B≪D	
# 10	90-100		B-48'	TO 96' TON SAND, MEDIUM, DAMP, FOORL GRADED, SP		BKG	•
			78-100	LT BRUSAND, MEDIUM - FINE - V. FINE, WET, WELL GRADED, SOME GRAVEL, SW		BKD	
S# II	100-110			SAND, S.A.A.		BKG	·
5#12	110-112.5			LT BEN SAND, WED - V. FING, WET WELL GRADED, WITH GRAVEL INCE TO GRENTER THAN HALF SAMPLE.	. 	£K-D	
				BOB 113FT. 10/27/89 6FM			
		(46	ANDONED 89			
		. 					

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FIELD BORING	LOG		•	BC	PRING NO.	OPM	-89-o⊃
MOJECT NO.: 6049- C	PROJECT NAME:	USATHAMA- BAA	•			PAGE	OF 2
CONTRACTOR:	MATHES	DRILLER: MA	د کامیا ہے	DATE S	TARTED 11-9-	ر خ ج	COMPLETED 11-11-5
METHOD: HAMMER	CASING SIZE: 9"		TIP eV: (0.02	er	PROTECTION L		
GROUND ELEV.:	SOIL DRILLED: 16	WATER	LEVEL: / 49	5	TOTAL DEPTH:	168	
OGGED BY: NSG	CHECKED BY	1: P Bolow	DATE:	11/20/8	7		

SAMPLE DEPTH IN		BLOWS PER	PEN.		COMMENTS ON	MONITORING	
NO.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
S -1	0,-10,			BROWN F. SAND AND SILT TR CLAY MOIST- WET	BURRING	ദ്ധാ	
5-2	10' - 20'			BY CULY MOUT - WETSM	211/05 min	. سا ر	
3	30' -30'			TAM F. SAND SOME SILT SOME GRAVEL DAY SM/6M	5 1/025 min	けんへつ	
- 4	30'-40'			SAME AS S-3 - BOULDER @ 37'		מאט	
	40'- SO'			SAME AS S.3 BULLSKY AT 44'	>1/3 mm	റുയാ	
6	eo'-60'			SAME AS 5-3 BOULD & AT 52	R 1'/min	DKC2	
5-7	60'-70'			SAME AS 5-3	21'/min	ふてい	
s - 8	70'-80			SAMZ AS S-5 SM			
5-9	80'-90			TAN F. SAND AND SILT TO GRAVEL MOIST SM	1'/mim	Bres	
5-10	ون-رحن			SAME AS S-9 SM	1'/mi~	BKCO	
: S-11	100'-110'			TAN F. SAND M SILT M GRAVEL MOIST-WET SP	1./1.25~~~	0160	

FIELD BORING	LOG		•	В	ORING NO. o	20-89-03
PROJECT NO.: 6049-	PROJECT NAME:	USATHAMA- BAA	Ρ		PAGE	a or a
DRILLING CONTRACTOR:	MATHES	DRILLER: MA	טועטוד א	DATE :	STARTED 11-9-BE	COMPLETED 11-11-89
METHOD: HAMMER	CASING SIZE: 9 "		TIP eV: 10.02	eV	PROTECTION LEVEL:	
GROUND ELEV.:	SOIL DRILLED: 168	-/ WATER	LEVEL: 144.6	•	TOTAL DEPTH: 16	8
LOGGED BY: ゃらく	CHECKED BY	1: P. Bolme	DATE: 11	- À -	89	

	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONITORING		
	FEET		REC.	PESCRIPTION	ADVANCE OF BOXING	TIP	LEL
S -12	110'-120'			TAM F. SAMB, M CRAVIL, TE SILT MOIST-WET SP	1/125mm	ദധാ	
5 - 13	120, 130			TAN F. SAMO THE GRAVEL	1/125 min	3860	
s - । ५	130'-140			SAM E AS 5-13	1/1.25 mir	DK63	
C1 5	140-150			BROWNISH TAN F. SAND TR GRAVEL BOULDER AT 144, MOST SP	1/2 min	3CES	
S —16	120,-160			TAN F. SAND M CRAVEL BOULDS AT 150 DRY SP	1 / mi~	الاف	
S -17	160,-138			TAN - GRAVEL, SOME SAND LUST GM	1'/mi~	7465	
				BOB 168'			
				·			
							-
			,				
	<u></u>				<u> </u>	<u> </u>	

FIELD	BORING	LOG	Boring No. DARGIOI
Project No6853c3 Project	Name USAT	HAMA RAAR	Pagei of3
Contractor MATHES	Onlier T. C.	BANK Date started	10/9/91 completed 10/9/91
Method HSA 44" Casing	Size	HNU 11.7/102 #3	Protection Level D
Ground EL Soil Di	THEO 89.5	4 below ground 87	Total Depth 89.5
LOGGES BY SANDIN CH	count by DRP	Date 10/11/91	·

IME	Sample	Depth in	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring HNU LEL
,800	5-1 A7101002	0-2	<u> </u>		Borning sundy silty gravelly Fill angular	5-1 ANALYTIUS	
830	S-Z Androx	4.5-6.5	1/2/2/3	N.0/97	Dark brown V.t. sand with silt/clay, dense	5-2 ANALYTRA	Skc Skc
835	5-3 A9101011	9.5-11.5	10/26/3742	1,6/ 1,6	damp. SM LIEHT BLOWN F- CSE SAND WITH POUNDED	5-8 ANALYTAA	ı Ric
	^{કુ} ન	(4,5-1 6 .5	56/10 ¹¹ 57/5.5"	ابع/ در	graved and cabble fragments, lower day SP UGHT sicion for sind lower, day scenned to how on slight petroleum offer but no verponse	s-a nef	Bro Bri
'845	5-5 Mic:021	19.5 - 21.5	20/37/ 31/46	2/2	un How combinent or jointed here's price stronging SP LIGHT BROWN SAMA, fine-med with some craws: and rounded wirdly loose, day, well graded SP	s-s Anniy Tiga	6.K
	s-6 `	29.5- 26.5	15 23 30 34	2.0\ 20\ 20	24.5-35.1 sand m-csa with 40% rounded graved louse dry SP 351-26.5 sand itan,	5-6 REF	St.
				·	generally fine with 5% med-cse sol and 5-10% gravel, loose dry		

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FIELD BORING	LOG	Boring No. 0A39
Project No 685303 Project Name LISATHA	MA BAAP	Page 2 of 3
COMPECTOR MATHES Driller T. C.	LANK Date started 10	-9-9/ completed 10-9-91
Method HSA 4'4ID Casing Size -	HNU 11.7(102) #3 P	rotection Level D
Ground & Soil Drilled 89.5	4 below ground 87 To	otal Depth 84.5'
LOGGED BY SANDIN Checked by DRP	Date 10/11/91	

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Sample	Depth in	Blows per	Pen Rec	Description	Comments on		ntorni	_
No	Feet	6 inches	Rec	Description.	Advance of Boring	HNI		L
5-7	19.5 31.5	15/36/ 32/31	n/c	LOST SADON SHOR IN HOLE. NO RECOVERY	Reference	TAR A		
Ś-&	99.5 - 41.5 -	55/32 50/51	20	Tran Sand Fine porty graded with trace mad-conse rounded grains and 5-15% fine-med rounded gravet loose, dry. Sp	Deference			
5-9	49.5 - 51.5	10/26/ 37/38	2.0	TAN SAND Fine ground pointy graded 50.0-50.2 Fine sand with rounded Fine gravel loose, dry. SP	Reference	W/V	gyis	
S-10	59.5- 61.5	14/40/ 45/50 For 10"	1.9	TAN SAND fine poorly graded with trace fine rounded graves SP	Reference	ልአል	OXia	
S-11		45/46	7.0	TAN SAND fine grained very well sorted, trace gravel. SP	Returence	346	\$\dol_{\dol_{\dol}}	
S-12	795 - 805	15/39/50		TAN SAND fine, well sorted with excerssioned fine to media zones. clear rounded quarte grains., SP	Reference	SAR	84's	

FIELD	BORING	LOG	Boring No. 0489101
Project No 685303 Project	Name USATHAN	n Bhap	Page 3 of 3
Contractor MATHES	Driller T: CR	ANT Date started	10-9-91 completed 10-9-91
Method HSA 4-1/4-10 Casing	Size	HNU 11.7 (10.2) 43	Protection Level D
Ground El. Soil Or	wed 89.5	4 below ground 67	Total Depth 89.5
Logged by SANDIN One		Date 10/11/91	

Iine	Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring HNU LEL
	5-13	84.5- 86.5	15/28/ 30/37	2.0	Tan sand fine V. well softed. damp. SP	Retrience.	TARATA S. S. E. S.
1200	5-14 Agicioni	89.5 - . 91.5	4 5 14) 36	7.0 7.0	TAN SAND fine to medium with trave kine gravel soturated, loose, SP	Analyticae	gra
					Water measured in augers 87.01 bgs.		
					BOB 89.5 HSA 91,5 kst s.spoon		
t			·	·		,	

FIELD BO	ORING LOG	Boring No. CAB-91
Project No 6853-53 Project Name	BAAP	Page / of 3
Contractor MATHES On	Mer Kentin Brighner Date started 10	-9-511 completed 10-5-51
Method HSA/4-75 Casing Size	1. 15" ID HNU 11.7 (10.2)	Protection Level D
Ground EL Soil Drilled	90' & below ground	Total Depth 92'
Logged by RAA. Checked t	DRP Date 10/10/41	

	Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring HNU LEL	AGAO Si Ti
o# :13	S-1 Agiezooz	6-2'	6/7/14/12	24" 24"	Brave fine Sand; little Sitt; trace clay and fine Tomicl; dry. (F.11)	1 22 m. (HVM -	ATR NAB	0.5
O8:20	5-7 Hiezer7	(۲۰۵	3/5/3/6	2.0/ 1.5	Brown fine Sand; little sitt and medium sand; trace Clay and fine to	S-2: Analytical	DAY.	o 5
08:30	5~3 Agiezci2	10-145 12.0	5/13/w/23	الم المؤادة	Bottom 1.2'- Brunto the fine Sul; trace	prillers over -	By Sty	0.5
, i		į			for to median grand. dry sh Top. 0.3' Brown Clary, moist, soft. 'true solt and for soul. SC	RIM requests not to do se, S-3: Analytical		
o9110	s-4	15-16.5	જી કર ે	હેતું	Ten fine and medina Soul; Little correct to fine randed grand; trace correct soul; all for dry.	5-4: Reference	Bk5. 1545.	EŁ,
	40G			·		·		

FIELD	BORING	LOG	Boring No. 048-91-02
Project No 6853-03 Project	Name RAAT	?	Page 7 of 3
Contractor MATHES	Dritter KKITH	Date started	10-9-91 completed 10-9-51
Method HSA/4-75 Casing	Size 4.15" J.D.	HNU 11.7(10.2	Protection Level D
Ground EL Soil On	Hed 90'	4 below ground	Total Depth 92'
Logged by R.W. Che	ted by DRP	Date 10/10/91	

	Sample	Depth in	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring HNU LEL] IAEID
09: <i>i5</i>			7/15/2426		Ton Madina Send; little fine send; touche course	5-5: Andytical	BE ATR BICS	Blc
. 591.40	s-6	25-16.5	<i>હોા</i> હ/૨૧		saul and Medium grand; dry. SP (Peppered with red and black minerals) Ten medium Soul, peppered w/sour gredsoud; trace fine and corner Soul and	5-6: Reforme	الايم الإلا	3F)
	S-7	30-31 [']	53/10c)	11%	fine to medium rounded gruel; dry. 5? Ton to Brown nehum sond; Some coarse sind and fine grund; 1. the medium ground and fine sund; dry	Rehaul at 100 Blow Courts. 5-7: Reference	34, 84,	<i>ن.</i> ن
10::5	s- &	40-42'	16/23 <i>/</i> 29	15/10	SW. Ten mechan Sul; little corrse send; trace fine to mechan grand - argula to subrounded; dry, 5P	5-8: Reference	- Bb; 75	₽٣٫
D':30	s-9	<i>5</i> v∙ <i>5</i> ℃	15/34A¥55-	2.0	Tan Fine Send; trace coerse and only Fine to med. subrounded graved; dry. SP	5-9: Reference	Bry Sty	gr ?
11.00	5-10	60 - 62	23A3/a/52	2 <i>5</i> / 15	Ton fine Send; france cocres sendent fine rounded gravel; day. 57.	18" golf gown wer drumb-inter. 5-10': Refelence	13 t 3 13 14 15 15 15 15 15 15 15 15 15 15 15 15 15	Bks

FIEL	D BORING	LOG	Boring No. O.A.S91-
Project No 6853-03 Pro	DIECT NAME BAAP		Page 3 of 3
Contractor MATHEL	Driller Konth	Date started	10-9-91 completed 10-9-91
Method 1/54/cm 75 CE	ang Size 4.15" J.D.	HNU 11.7 (10.2)	Protection Level T
Ground EL So	I Drilled 90'	4 below ground 91'	
Logged by RH4	Checked by DRP	Date 10-18-91	

	Sample	Depth in Feet	Blows per 6 mores	Pen Hec	Description	Comments on Advance of Boring	_	Oniti	LEL	Jani
ı/÷30	5-11			2.4	Ten fine Send; trace making Send with fine rounded grand; day. 5 P	5-11: Reformer	348	ATR		rck.
12:15	5-17	- ઉંઝ-બ્લ.ર્ડ	12/16/38	1.5/ 1.5	The firm Soul; the median soul; dry SP	5-17: Reference	Bk,	Rky	- کادی	BL
				2. <i>5</i> / 0.7	The fine Send; trace median and everso send; wet	5-13: Andyticol	BY	RY	B	·,
						come word to drive species.				
·						electric trape _ Button of horizon in dry, but the rods their is felled with water.				
	_					T.D. 92'				
	٠.		·							

FIEL	D BORING	LOG	Boring No. CAB9103
Project No L&5303 Pro	HAHTAEU OTEN ISE	MA BAAP	Page 1 of 3
Contractor MATHES	Driller T. Ci	CANL Date started 10	16 1 completed 10 . 16 . 91
Mestos HSA 416" CE		HNU 11.7(10.2) # 3	Protection Level
Ground EL So	i Drilled 89	T pelow bronud 862	Total Depth 29 9/
LOGGES BY E. SHIPIN	Checked by DRP	Date 10/16/91	

Sample	Depth in	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring			x no
S-I	0-2	9 9 8 9		bown sindy greveily fill, loss, dry from 0-0.5. 0.5-1.8 dark brown 5.11, stiff dense, very slightly plastic	ANALYTICAL SAMPLE A9103002	1 5 mon off	AJR	21.0
S-2	4-6	<i>ज्</i> डि ८ ७	اري در اي	brown silty clay moderately plastic armains to light brown wet fine sand well sorted.	ANALYTICAL SAMPLE AGIO3006	3/4	aya	
5-3	9-11		2.0		ANALYTICAL SAMPLE A9103011	gka	aka	
S-4	14-16	15/25/ 33/25	2/80 2/80	dry 14-15.1 tan sand fine well sorted dry 15.1-16 tan gravelly Sand, loose dry	Reterence Sample			V

FIELD BORING	LOG	Boring No.048711
Project No685303 Project Name USATH	AMA BAAP	Page <u>2</u> of <u>3</u>
Contractor MATHES Driller T. C.	RANK Date started jo.	6-91 completed 10-16-91
Metros HSA 414 Cases Size	HNU 11.7(10.2) 3 PT	
Ground EL Soil Orilled 89	I below ground 86,5 To	tal Depth 9/
LOGGED BY B. SANDA Checked by DRP	Date 10/16/71	

Sample	Depth in Feet	Biows per 6 mones	Pen Rec	Description	Comments on Advance of Boring	MO	nitorng
5-5	19-21	5/20/35/ 50 4'	4	light brown sand fine to corase with trace rounded graved maist, lowe	ANAUYTICA L SAMPLE 09103021	SE STON	E SO MAN
S-6	24-26	12/28 43/45	NO.	tan to brown gravelly sand, fine to coarse with 30% rounded gravel	Reference Sample	are	والم
S-7	29-31	21/21/ 21/38	1.8	ten sand, time, well sorted, loose grading to fine to course with smell gravell, loose, dry	Reference Sample	926	OKIA
s -8	39-41	12/17/ 30/40	20/2.0	Sand tan fine well sorted occaissimal fine to medium well sorted, trace growel, loose, moist	Reference Sample	A14	HES
		-					

Project No635303 Project Name USAHAM BAA? Contractor MATHES Onlier T. LIANK Date started 10 -16 -91 completed 10 -16 -91 Method HSA Q1/6 Casing Size — HNU 11.7(10.3) = 3 Protection Level D	FIELD	BORING LO	G	Boring No.0AB9103							
	Project No665303 Project	Name USATHAM	BAAP	Page 3 of 3							
Method HSA q /e' Casing Size HNU 11.7/10.2 = 3 Protection Level >	Commector MATHES Driller F. CAANK Date started 10 -16 -91 completed 10 -16 -91										
		ize HNU	11.7(10.2) # 3 Pro	tection Level D							
Ground El Soil Drilled 89 4 below ground 865 Total Depth 92 91	Ground EL Soil Dri	led 89 II	below ground 865 Total	Depth 🕦 9/							
Logged by E. SANDIN Checked by DRP Date 10/16/91	LOGGED by E. SANDINGHE										

Sample	Depth in Feet	Blows per 6 inches	Pen Hec	Description	Comments on Advance of Boring	Monitoring HNU LEL
5-9	c.	37/50	20	moist. occassional med to coorse layers	Reference Sample	TAR DICTON DAY
5-10	59-61	11/23 36/50	2.0 2.0	tan sand fine with trace graved similar to 5-9	Reference Sample	हरू हर्म
		48	7,0	tan sand, fine well sorted occursions medium sand layering no gravel, monst buse	Reference Sample	845 748
9-12	79-81	16/30/ 36/43	20/2	tan sand fine well sorted, damp to conse sand to fine gravel	Rekonence Sample	6,40 9,40
5-13	89-91	4/8/	2.0 2.0	tan sand, fine well sorted frace course, trace gravel, buse wet,	Analytical Sample A9103091	este este
				Bob 89 Augers 91 stoon		

BORING NO. CABEGOI FIELD BORING LOG PROJECT NO .: 6049- C4 PAGE / PROJECT NAME: USATHAMA- BAAP ORILLER: ECI CECCIK DATE STARTED 16-17 89 MATHES COMPLETED 12 17 & DRILLING CONTRACTOR: PROTECTION LEVEL: MCG D CASING SIZE: 4.25 ID TIP ev: 10.6 METHOD: HSA TOTAL DEPTH: 92 C WATER LEVEL: 85.3 SOIL DRILLED: 92' GROUND ELEV .: CHECKED BY: P. Bolmer LOGGED BY: D LaRUE DATE: 11/20/69

SAMPLE DEPTH IN NO. FEET		BLOWS PER F		DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONITORIN	
NO.	PEET	0-1 NCHE2	REC.	DESCRIPTION	ADVANCE OF BOX 140	TIP	LEL
5-1 A8901000	0-2	10/10/8/9	7.6	Tark brown gravilly wilt Zou planticity; loc-is, clamp meeting ph-6 (GM)	5-1 Analy heal	- 2	3:
5-2 A8901005	5-7'	4/7/7/9	7.5	Dark brown suity clay, trace gravel. Moderate planticity, loose, classe. (CL) PH-6	5-Z Analy hical	- <u>-</u> 2 -2	
5-3 98901010	10-12	13/30/33	1.5	Tan to med brown gravely sand (gravel wige up to 3") Sand us med. or, poorly seried, dense, damp, no plast. ph-6 (SW) *Change between 7-10.	5-3 Analy heal	-2/3	
5-4 Reference	15-17'	4 16 30 32		15.0 to 15.1: Med. Drzwi grawelly sand (Potely sorted, dans) nottled, no plas ainse) 15.1 to 16.0: Med. op. clean tan Nama (well horted, dans, no plast, trace heavy mineral) 16.0-17.0: Med. brzwi, med grained gravely hand No plast, poorly lotted, dense, dansp. (Gravel 8132. 1" 103") DH-6 (SWISP)		- z/ /2.5	

.

FIELD BORING	LOG		BORING NO. CABGGET				
JECT NO.: 6049- 0	PROJECT NAME:	USATHAMA- BAJ	NP .		PAGE Z OF 5		
PLLING CONTRACTOR:	MATHES	DRILLER: Ed	Clark	DATE STARTE	ED 10-17-89 COMPLETED 10-17-89		
HETHOD: HSA CASING SIZE: 4.24		51D TIP eV: 10.6		PR	NOTECTION LEVEL: NICH . D		
GROUND ELEV.: SOIL DRILLED: 92		.0' WATER LEVEL: 65.3'		3΄ το	OTAL DEPTH: 92-C		
LOGGED BY: Diaku	CHECKED B	r: P. Bolme	DATE:	11/20/89			

SAMPLE	DEPTH IN	SLOWS PER PE		ACCEPTATION	COMMENTS ON	MONITORING		
NO.	FEET .	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL	
5-5 A8901020 -	30-23	15/41/24/27	2.0	mec bour to time, mo granicing hand No ilas, peoply routed, ainis, dry to damp that line of med gh. liean hand PH-6 (510)	54 Analytical	- = = = = = = = = = = = = = = = = = = =		
5-6 Referenci	25-27	15/16/28/40	<u>20</u> 1.7		Lande	4.5		
S-7 Peference	3 0 - 32	13/30/33/56	300 00	30-31 Muo. br., med gr. gravelly sand. No plas, perrly sorted, damp, dense. 31-31.6: Tan, med. gr elean sand, trace gravel. Mod. to good serting, no plasticity, dense, damp. * See "varied" sequence of seety sand in this	Reference	-4		

FIELD BORING	LOG	BORING N	BORING NO. DABETOI			
PROJECT NO.: 6049- 04	PROJECT NAME:	USATHAMA- BAA	LP		PAGE	3 of 5
DRILLING CONTRACTOR: M	IATHES	DRILLER: Ed	clark	DATE STARTED 10-17	- દેવ	COMPLETED 16 17-6
METHOD: HSA	CASING SIZE: 425	ID	TIP ev: 10.6	PROTECTION	LEVEL:	Ucd.D
GROUND ELEV.:	SOIL DRILLED: 92	. WATER	LEVEL: 653	TOTAL DEPT	H: 92	/
LOGGED BY: D. La Rice	CHECKED BY	: P. Bolner	DATE:	1/20/89	······································	

SAMPLE NO.	DEPTH IN	EPTH IN BLOWS PER PEN. FEET 6-INCHES DESCRIPTION	DESCRIPTION	COMMENTS ON ADVANCE OF BORING		TCRIN	
			REC.	ocourt 1 de	ADVANCE OF BOXING	TIP	LEL
	36 - 37 Centid			unterval. 14" apacht, 2mm lige 31.6 1232 Med gr. tan Land, med. scrting dence, damp. pri-6 (SWSP)			2
S-8 Riferense	40-42	r4 2≤ 3€ 42.		Tan, mes on graveily Nand. Dorrly serted, no plas, deme, ciamp. Some motting. Gravel is. dominated thru suret 6°, then grades to much smaller and of lize (4°, about 10%) (500) pH-6	Referènce	7-3	
5-9 Sekrenec	50-52'	S 26 30 29		alternating layers of med. op gravely, samo (Poor souting, no plan. aense, ary) with tan, med. op., At fire op. elean sano. (will lean sano. (will lane, dense, damp, sight mothing) (SWISP) ph-6	Reference	ن ا <u>ن</u> شالی	
		,			~.		

BORING NO. CARRIGOI FIELD BORING LOG PAGE 4 POJECT NO.: 6049- 04 PROJECT NAME: USATHAMA- BAAP OF 5 DATE STARTED 10-17-59 COMPLETED / - - 2 - - - -LLING CONTRACTOR: MATHES DRILLER: Ed COUCK PROTECTION LEVEL: Nicol . D CASING SIZE: 4.25 1D TIP eV: METHOD: HSA 10.6 SOIL DRILLED: 921 85.3 TOTAL DEPTH: 92 GROUND ELEV.: MATER LEVEL: CHECKED BY: P. Bolow DATE: 11/20/89 LOGGED BY: D LaRue

SAMPLE	DEPTH IN	BLOWS PER	PEN.	ACC: 010710U	COMMENTS ON	MONT	TORING
NO.	FEET	6-INCHES	REC.	DESLRIPTION	ADVANCE OF BORING	TIP	LEL
5-10 Reference	66-62	11/28/34/37	2.0	Tan. ma.g. elian land. There graves well screed, no picut.	Reference	- 3	21
		-		Course lens of med gr. Granelly hand. Few med. In sitty sand largers ("Zmm thick). Sample is damp to merst cureetly underneath these largers			
Reference	70-92	1929/35/38	3.90 3.00	(SW) pH-6 Tan, med. y. clean sand. That gavel, well sated no plant, dense, dans. Dk. brown sancing seit layers as before (20mm) Slight matteria. (SP) pH-6	Reference	-3	
5-12 Reference	60-8z	ાર્યટક(43/ 49	·	Tan, med on clean sand Mod to well screed. Trace gravel. Non plastic, dense dry to damp. Some modeling. Trace heavy minual. (SP) pH-6	AGNADE	- 3 - 3	
					~		

FIELD BORING	LOG		В	BORING NO. CAREGOI				
PROJECT NO.: 6049-	PROJECT NAME:		P	AGE 5 OF 5				
DRILLING CONTRACTOR:	MATHES	K & DATE	DATE STARTED 10-17 89 COMPLETED 12 17 80					
METHOD: HSA	CASING SIZE: 4.2	SID TIP ev:	10.6	PROTECTION LEV	EL: Mcci D			
GROUND ELEV.:	SOIL DRILLED: 9	ZO WATER LEVEL:	90.0'	TOTAL DEPTH:	97 C			
LOGGED BY: D. Lar	CHECKED BY	: P. Bolmer	DATE: 11/20	189				

SAMPLE	DEPTH IN	BLOWS PER	PEN.	Account to	COMMENTS ON	MON I	TCRIN
NO.	FEET	S3KJKI-6	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
5-13 AB901090 90-92 17/43/.	17/43/.	1	Tan, med on sand will soited, truck himry momeral, truck opacels. No peachedy, dense, saturated pH-6 (SP) * het water at 90'.	5-5 Analy Tical.	-3 -3	21	
		,		— T. D. @ 92'			
	·				·		
			·				
		•					

FIEL	D BORING	LOG			BORING	NO. OAB-	39.8	02
ECT N	io.: 6049- (SY PROJECT	NAME:	USATHAMA- BAAP		PAGE	of 3	
DRILLING	CONTRACTOR:	MATHES		DRILLER: Ed D.	ATE STARTED	0/23/19 COMPL	LETED 10/	24/2
METHOO:	ME -755	CASING SIZE:	41/4	1/D TIP ev: \$11 /	0.6 PROTECT	TION LEVEL:		7
GROUND EL	EV.:	SOIL DRILLED	: 107	WATER LEVEL: 912	TOTAL C	DEPTH: 102		
LOGGED BY	: Buss/6	LA CHE	CKED BY		11/20/89			
	7	J						
SAMPLE NO.	DEPTH IN	BLOWS PER	PEN.	00000107104		COMMENTS ON		TORING
HU.	FEET	6-INCHES	REC.	DESCRIPTION	•	ADVANCE OF BORING	TIP	LEL
S-/	0-2	5 34	17/24	light brown med so angular gravel dry. grading to dark brown gravel. FILL sm	Sand and moist. Silt wit	Bkgdebeckgraum =0-5ppm	Bkeyd	
<i>S</i> · <i>z</i>	5-7	5 ₅ 77	15/24	light brown med-Sine with little silt and occurrence angular Fill moist-	SAND as. grand wet		BKg	
S-3	po-12	10127423	14/24	light brown med-50 wor little sitt and oc iron staining, dark black sitt clay plas 11.5-125% sm-me	ine SAM cas. grav brown to stic at L FILL	FILL	Blegd	
S-4	15-17	20 36 50 55	18/24	light brown cree- and G.RAVEL dry glaciolaustrine	Sine SAM -moist Nose	Native	Bla	/
5#5	20-22	3817	20/24	tan medium sine SI moist, Brown gravelly 21.5 St. glaciolaus	AND dy layeral lso-se lvine		Bkgs	

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o.: 6049- O	A: T			,	()	AB-89-	
	PROJECT	NAME: USATHAMA-	BAAP		PAGE	2 of 3	
CONTRACTOR:	MATHES	ORILLER:	F.L Clark	DATE STAR	TED 10/22/4	COMPLETED 10	furt.
Augers	CASING SIZE:		TIP eV: #	D.6	PROTECTION LÉVEL:	D	, ,
EW:	SOIL DRILLED:	102	IATER LEVEL: 91,2		TOTAL DEPTH: 10	<u></u>	
: Buss/chi			DATE:	11/20/8			
/							
DEPTH IN FEET	BLOWS PER 6-INCHES	PEN. REC.	DESCRIPTION				LEL
25-27 25-52 30-32 TAB	610,9	14/ Simile	ur to 8#5	5 -50		Bkge	
JAB 30-32	15 ₂₆ 32 57	20/ brown 24/ Subar glacio:	n Cuse-Sii ng. to named Sluvial, SP	ie san gravel	dust	BKGJ	
10-92 5785	12 19 26 32	22 In 3	Sine-med s d sine-med zones 51	Sank wto Sand + C n	rse	Bkc	
50-52 TAB	10 23 30		Med-Sine-S/ - stratised 200	AND at		Bky	
60-62 JAB	15 ₃₂₄₄	at 713	97 dark med se sand be	Sinesan low 715	ud	Blogs	4
	DEPTH IN FEET 25-27 77-32 TAB 30-32 TAB 50-52 TAB 60-62	SOIL DRILLED: BUSS Chucks berg CHECK DEPTH IN BLOWS PER 6-INCHES 25-27 6 0 9 26 TAB 526 32 30-32 57 50-52 6 32 50-52 6 32 50-52 6 32 50-52 7 32 50-52 6 32 50-52 7 32 50-52 6 32 50-52 7 32 50-52 6 32 50-52 7 32 50-52 6 32 50-52 7 32 50-52 6 32 50-52 6 32 50-52 6 32 50-52 6 32 50-52 6 32 50-52 7 32 50-52 6 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52 7 32 50-52	SOIL DRILLED: D2 BUSS/Clucksberg CHECKED BY: P. B. DEPTH IN BLOWS PER PEN. FEET 6-INCHES REC. 25-27 6-INCHES REC. 25-27 5-27 5-26 7-26 7-27 5-27 5-27 5-27 5-27 5-27 5-27 5-27	BEST SOIL DRILLED: D2 WATER LEVEL: 91.2 BIJSS CHUCKS DERG CHECKED BY: P. Bolow DATE: DEPTH IN BLOWS PER PEN. DESCRIPTION 25-27 6 10.9 24 Similar to S#5 TAB	SOIL DRILLED: D2 WATER LEVEL: 91.2 BUSS/CHUCKSDERG CHECKED BY: P. Balmer DATE: 11/20/8 DEPTH IN BLOWS PER PEN. FEET 6-INCHES REC. DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION D	SOIL DRILLED: 102 WATER LEVEL: 91.2 TOTAL DEPTH: 10 BUSS CHUCKS DOTG CHECKED BY: P. Balmer DATE: 11/20/69 DEPTH IN BLOUS PER PEN. DESCRIPTION ADVANCE REC. DESCRIPTION ADVANCE 25-27 6 10 19 26 124 Similar to 8#5 5 50-58 JAB 526 32 20 brown Crse-Sine Sandul ADVANCE 25-27 6 10 19 26 Subara, to rounded gravel glacio Sluvial. SP gravel glacio Sluvial. SP gravel and zones. SM 20-32 129 26 129 129 129 129 129 129 129 129 129 129	SOIL DRILLED: 102 WATER LEVEL: 91.2 TOTAL DEPTH: 102 BUSS/CHUCK Short CHECKED BY: P. Balmer DATE: 11/30/89 DEPTH IN BLOWS PER PEN. DESCRIPTION ADVANCE OF BORING TIP THE STATE OF THE STATE STATE SAND AT THE STATE SAND AT THE STATE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE SAND AT THE S

BORING NO. 0AB-89-02 FIELD BORING LOG ECT NO .: 6049- 64 PROJECT NAME: USATHAMA- BAAP DRILLING CONTRACTOR: MATHES DRILLER: Ed Clark TIP ev: #// /06 PROTECTION LEVEL: WATER LEVEL: 91.2 STBGS TOTAL DEPTH: SOIL DRILLED: 1025t CHECKED BY: P SAMPLE DEPTH IN BLOWS PER COMMENTS ON DESCRIPTION ADVANCE OF BORING FEET 6-INCHES LEL 20/ Similar to S# 9 wt layered easy dvilling masic sands v. thin dry-moist. easy dvilling 17/ Similar to 5#1/ possible 21 x bedding. moist-dry 5#13 90-92 7 18/ light brown med: 5n SAND 21 coarse Sand at 91.6 to 91.7 St. wet SP smooth drilling below WT. similar to S#13 no med-croe sand layers, no stratisation. se only a 1 It hear into augers-WL= 91.2'BGS 102 St= BOE.

FIELD BORING LOG NO. 0AB:8903 PROJECT NO .: 6049- 04 PROJECT NAME: USATHAMA- BAAP PAGE / DRILLING CONTRACTOR: MATHES DRILLER: Ed Clark DATE STARTED 10-16-89 COMPLETED 10.17.54 METHOD: HSA PROTECTION LEVEL: NICO D CASING SIZE: TIP ev: 10.6 4.25 ID GROUND ELEV .: SOIL DRILLED: 97' WATER LEVEL: 90' TOTAL DEPTH: CHECKED BY: P. Bomer LOGGED BY: D. LaRue DATE:

SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6-INCHES	PEN	. DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MON	TORING
			REC		ADVANCE OF BOXING	TIP	LEL
5-1 A8703200	0-2'	2/4/6/7	2.0	Top 6" dark brown sandy gravel Surface material grades to dark brown gravely set mottling. Poorly sorted, damp, mod		-Z -Z	21
5-2 18903005	5-7'	4/4/7/1	2-0	platicity, loose (GM) pH-6 Dark to med blown sandy self. Gravel in the top 1". Some nottling. Mod. plasticity, loose, poorly lorted, dare to moist. Grades to fine selty sand at base.	s-z Analyhical	<u>-2</u> -2	
5-3 Af903016	10-12'	6111/22		Top 6" grader from tax, fine of grader from hity sand to dark brown rety sand to play, damp. At 11.0: Med. gr. tax sand with trace gravel. No play. dry to damp, poor sorting med. dence. (OP) pH-7	5-3 Analytical	- <u>2</u> -z	
				*Change at 10.0' *Change at 11.0'			

FIELD BORING LOG

BORING NO. 0ABE 903

JECT NO.: 6049- 04 PROJECT NAME: USATHAMA- BAAP PAGE 2 OF 5

DRILLING CONTRACTOR: MATHES DRILLER: Ed Clark DATE STARTED 10.16.89 COMPLETED 10.17.89

METHOD: HSA CASING SIZE: 4.25 ID TIP eV: 10.6 PROTECTION LEVEL: MOD D

GROUND ELEV .: | SOIL DRILLED: 97' WATER LEVEL: 90.0' TOTAL DEPTH: 97'

LOGGED BY: D. La Rue CHECKED BY: P. Borner DATE: 11/20/89

SAMPLE NO.	DEPTH IN	BLCWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONI	TORING
NO.	FEET	0-INCRES	REC.	J. J. J. J. J. J. J. J. J. J. J. J. J. J	75771152 51 5577115	TIP	LEL
5-4 Reference	15-17	7/28/32/30	2.0	med. moure to true, med. gr. gravelly hand. Poorly herted, no planticity damp dense Mottled. a eouple tax, clear med. g. nand clens! Well horted, alens. (SP/GP) price	Reference	-7.0	
S-5	20-22	18/24/30/40	20	TO 21.0: Med. brown, med. gr. gravely rand. (Crawl up to 3" rize) Poorly serbed, no plant, dense, damp. TO 22.0: Tax, med to fine quelean rand. well sorted: No plan, dense, dry to dense. Trace heavy mineral. (Sw/SP) pH-6 + change at 21.0	5-4 Araly Fical	-2.4 2.0	
5-6 Reference	25-27	ાર્ગયા/4ક/42	Z-0 1-8	med brown to tan, med. op. gravely Land. (gravel - ~30%, size 1/4") Poorly Lorted, no plast., dense, damp. Mottled (Sw) + Change between 22' \$25'	Reference	- 2	

BORING NO. 0258963 FIELD BORING LOG PROJECT NO.: 6049- 64 PROJECT NAME: USATHAMA- BAAP PAGE 3 OF 5 DRILLING CONTRACTOR: MATHES DRILLER: Ed CLOUR DATE STARTED 10.16.89 COMPLETED 10.17 5. CASING SIZE: 4.25 ID PROTECTION LEVEL: MOD D TIP ev: 10.6 METHOD: HSA GROUND ELEV .: SOIL DRILLED: 97' WATER LEVEL: QC.01 97.0' TOTAL DEPTH: CHECKED BY: P. Bolmer LOGGED BY: D. LaRice DATE: 1/20/89

SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MON	TORING
			REC.		ASTANCE OF BOXING	TIP	LEL
5-7 Reference	30-32	14/27/35/26	2.0	tan med of gravely hand (Poolly horted, derve, nonpleasur, camp) with tan clean, med to fine of hand (will sorted	Refuerce	-2-2	21
5-8 Roference	40-4z	10 23 40 47		no plaiticity, dinse, danse, Mattling. (3P)SW) pH-6 Tan, ned. on gradelly sand. Poorly seried, no plase, dense, danse. Motiling. They small (~2mm) nety sand lawns located in the uself seried sand. Layers are	Reference	-2.6 -1.6	
5-9 Reference	50-5 2	12/20/27/35	z.0 z.0	approx 1/4" apart consist. (varved appearance. XGH) pH-6 Top 2": Tan, med. qn. gravelly send. Poorly serted, no plasticity, dense, damp. Mert 1": Tan, med qn. sand (trace gravel) med. sorting no plasticity, dense, damp. At 51:2: med. brown, very fine qn sand leno, 2"	Reference	-2-2	

FIELD BORING LOG

BORING NO. 0AB8903

ECT NO.: 6049- 04 PROJECT NAME: USATHAMA- BAAP PAGE 4 OF 5

DRILLING CONTRACTOR: MATHES

DRILLER: Ed Clark

DATE STARTED 10.16 89

COMPLETED 10.73 87

METHOD: HSA

CASING SIZE: 4.25 ID

TIP eV: 10.6

PROTECTION LEVEL: Mod D

METHOD: HSA CASING SIZE: 4.25 ID TIP eV: 10.6 PROTECTION LEVEL: Mod. D

GROUND ELEV.: SOIL DRILLED: 97' WATER LEVEL: 90.0' TOTAL DEPTH: 97.0'

LOGGED BY: D. La Rue CHECKED BY: P. Bolmer DATE: 11/20/89

SAMPLE	DEPTH IN	BLOWS PER	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONI	TORING
NO.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BOXING	TIP	LEL
				irick. No plasticity, very well seried, dense, danp. 51.4 to 52.0 grades from tan very fine gravely sand to tan, gravely sand, med. op. Poorly serted, no plasticity, dense, danp. (50) pt-6			31
O Pence	60-62	M25 35 55	2.0	Tan, med. of gravelly sand layers acturating with layers of tan, med of clean sand. To plasticity, damp, cleans. Gravely sands are poorly sorted, med. clean sands are used seited. Slight mattling. (GP/SP) pH-6	Reference	-Z -1.3	
5-11 Reference	70-72	16/24/47/39		Tom, med of sand. Trace gravel. Moderate sorting, no plasticity dense, dans to moist. (SP) ph-6	Reference	-2 -7.4	

BORING NO. 0488903 FIELD BORING LOG PAGE 5 OF 5 PROJECT NO.: 6049- 04 PROJECT NAME: USATHAMA- BAAP DRILLER: Ed Clark DATE STARTED 10-16-89 COMPLETED 10-17-8. MATHES DRILLING CONTRACTOR: PROTECTION LEVEL: Road D CASING SIZE: 4.75 ID TIP ev: 10.6 METHOD: HSA WATER LEVEL: 90.0' TOTAL DEPTH: 97.0' SOIL DRILLED: 920 GROUND ELEV.: CHECKED BY: P. Bolmer DATE: 11/20/89 LOGGED BY: D. ha Rue

SAMPLE	DEPTH IN	BLOWS PER	PEN.	DECCRIPTION	COMMENTS ON ADVANCE OF BORING	MONI	TORING
NO.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
5-12 Reference	80-82	(4 १३) ४०/५ (2.0	sand (Poorly Lorted, no placticity, cleare dam) with tax, ned to jure gr. clean sound (well sorted, no placticity, dense, clamp) Some med b Lety sand layers (1-2mm) in the clean	Reference	2.0	21
5-13 A8903090	90-92	4/13/25/40	<u>z.0</u> 1.6	Nemos. (GP/SP) pH-6	5-5 Analy heal	<u>-2</u>	
5-14 Reference	45.97	6/10/18/32	<u>2.0</u> 1.8	Tan, med on sand. Livell Norted, no plas, dense saturated. (SP) pH-6	Reference	亳	
				-T.D. 97'			

FIELD	BORING	LOG	Boring No. 044-91-01
Project No.06853-63 Project I	varme Balower	2 AAP	Page 1 of _1
Contractor LAYNL	Driller G. Ro	Date started	10-27-91 completed /0-27-91
METOD DUAL WALL COSING S			Protection Level D
Ground EL Soil Drill	ed /00'	4 below ground 825	Total Depth /06'
Logged by RRR Check	ued by DRP	Date 10/30/91	

112 Comments on Advance of Boring Sample Depth in Blows per Pen 6 inches Rec Monitoring Description No Feet HNU LEL BROWN SILTY SONO, WHO TAR ATR 5-1 0-10' (SM) F, Some M, 72 C CONESIVE. DAMP 0 IT BROWN SAND, WLD, M-C 10-20' 5-2 0 4 צעש WITHE F. LITTLE F GRAV. TR COBBLES ٥ 20 - 30' - SAME AS 5-Z (SW) 0 5-3 - SAME AS S-Z 30-40' ভ্ৰু 5-4 LT BROWN SOND, PLO. MODERATTE 5-5 40.50' 0 (SP) GRADED, M, LITTLE F, LITTLE C, TR GBBUS. LT BROWN SOUP, WED, M, 50-60 5-6 (حیل LITTLE F, SOME C, LITTLE F GRAV <u>(3</u> SAME AS 5-6 60-70' 5-7 0 SAME AS 5-6 SW 70 - 20' 5-8 (P) 0 LT BROWN SAND, PLD, M 80 - 90 5-9 LITTLE C, TR F GRAV, TR 88.5 F SAND 0 • 80.93 - LT BOWN SAND, WED, M. 5-10 90-100° الوی SOME C, LITTLE - SOME E GRAV. 93 100 BROWN SAND, PLD. F. (59) LITTLE M, TR SILT 100' = B.O.E.

FIELD	BORING	LOG	Boring No. Frb.9
Project No6953-03 Project	Name BAAP		Page ot
Contractor MATHES	Driver KUH	BURRINDEDER STERIED /	/22/91 completed 10/22/91
Method HSA Casing S	120 4'4"10	HNU 11.7/10.2	Protection Level D
Ground EL Soil Drit	ed 90'	T below ground	Total Depth 92'
Logged by 6/47LDS Chec	ked by DRP	Date 10/2-2/91	

Sample	Depth in Feet	Blows per 6 inches	Pen Rec	Description	_	Comments on Advance of Boring	Monitoring HNU LEL
5-1	0-2'	3-5-5-7	18-		grevel,	العنين	BAL BAK
5.2	\$2°	\$6:2=8	Lo	well graded, por . pt love (FILL) 0.3 Dark brown his sa Some fine grand, we non-plastic, woose, de (FILL)	- 2.0 I 5plit el-g/alsd	Analytical Backgrical	
5-2	5-7'	5-678	2,0	o.o- o. B' Black ! Such SILT, well gradients planted with od odon o.B., Light brain Silt granted, sightly planted modum dense	eded, _devse, fruil 2.6 ,uest	Anaphical	20 17
<i>5</i> -3	lo -12'	2-4-4-6		Brownetter fine SIN Occasional SILT la well graded, non-pl South Slighty Flavo Silt: Imme, Stran Some Sporatic Gil S	artic tic lified,	Analytical	1.0 Bis-

F	IELD BORING	LOG	Boring No. FTB91-01						
Project NOGS 3-03 Project Name USATHAMA - BAAP Page 72 01 3									
Contractor MATH	Competer MATIES Driller K. Buinse mayor Date started 10/22/91 completed 10/22/91								
Method 173/A	Casing Size 4/4" ID	HNU 11.7/10.2	Protection Level P						
Ground EL	Soil Drilled 90'	4 below ground	Total Depth 92'						
Logged by WHICE	S Checked by DRP	Date 10/22/91							
•									

Sample No	Depth in Feet	Blows per 6 inches	Pen	Description	Comments on Advance of Boring	Monitoring HNU LEL
5-4	15-17'	9-17-45. 50	2.0		Analytical	JAR AIR 25 SPET
5-5	20-20.9'	33-160/ ₅₀ ,	0.7'	Some as 5-4, colock fragment in spoon-tip	Reference	85 82
5-6	5e-54.	14·20·20· 30	<u> </u>	Tan fine to oredism SAND with Some Course sand and Fire grand strata, excassion course subargula grand, party graded, non-plastic, dear, dry	Peference	BK 346
\$- 7	30-32 . '	12-25- 30-28		70 C. CA >	Reference	3KFX

FI	ELD BORIN	G LOG	Boring No. F16-91
Project No.LOS3-03	Project Name USA?	HAMA - BAAP	Page _3_ of _3_
Contractor MAT	ME3 Driller K.	unselmeyon Date started	10/2 2/11 completed 10/22/91
	Casing Size 44 7		Protection Level D
Ground El	Soil Drilled 90'	T below ground	Total Depth 92'
Logged by WCHIL	75 Checked by DP	P Date 10/22/91	

Sample	Depth in Feet	Blows per 6 inches	Pen Rec	* Description	Comments on Advance of Boring	Monitoring HNU LEL
5-8	46-42	17-22 26-30	2.0:		REFERENCE	TAR ATR
5-9	50-52	15-24 28-33	2.6	Sine as 5-8	Kereneve	31 C
5-16	62-62	10-17 - 23-40	2.0	Some as 5-8	RETECENCE	34 34 A
<i>ુ</i> ના	70-72	19-23 30-40	2.0	Pack medu son, Party graded non- Picstre, very dance	REFERENCE	\$432C
512	80-82	în-25 31-46 _	20	dry. stritified Same as 5-11	REFERENCE	ENG.
5-17	3 0-92	B-22- 25-50	20/20	Tan Ci Smin Kar	AWAZYTIUR	BKK.
				Terminated bering at 92.0' depth bys		

FIELD	BORING	LOG	Boring Nafib9102
Project No685303 Project	Name USATHA	IMA BAAP	Page _1 ot _3
		LANK Date started 10	·22.71 completed 10/22/91
Method HSA 4 /4 Casing S		HAU 11.7/102) # 1 1	
Ground EL Soil Dri	led 87	T below pround \$,5	Total Depth 89
LOGGED BY E. SANDIN CHEC	xed by DRP	Date 10/23/91	

. 1

	Sample	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring HNU LEL
406	5-1	0.S-z. _S	1-4-8		5.14 beneath asphalt 0.8-2.5 brown to	Anolyticae Sample F9102002	MARAIN DEC
1415	5-2	4.5-6.5	4/5/	ዲ ዕ	gray to brown silty clay, dense, plastic, method brown,	Analyticie Samply F9102006	of Xe
1420	5-3	9,5-11.5	4/9/ 21/27	2.0 1.7	plastic 9,7-brown sand fine to coarse with 70% rounded gravel	ANALYTICAL SAMPLE F9102011	7.4.8 4.1.8
	s-4	14.5- 16.5		14 18	brown sandy gravel Fire to coasse with 40% rounded gravel	Refierence Sawpk Honlspace-Bkg	eku

FIELD	BORING	LOG	Boring No. F18910
Project No 685303 Project	Name USATHAN	NA BAAP	Page 2 01 3
Contractor MATHES	Driller T. C.P.	ANK Date started	10-22-91 completed (C/22/9)
Method HSA 4'4' Casing S			Protection Level D
Ground EL Soil Dri	led 9.7'		Total Depth 89'
LOGGED BY E. SANDIN Chec	sed by DRP		

Sample	Depth in	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring (onito	
				<u> </u>		*	AIR	LEL
5-5	19.5245	15/26/	1	Sand, tan, medium to	Analytical .	\mathcal{Z}_{Z}		
		34/50	2.0	coarse with some fine	Sample	\Q'>		
	1	ļ		and 20% rounded gravel	F9102021	h	\$	
				loose, dry, well greded		aku	なとな	
		,			Reference	1		
15-6	24,5-	10/20	2.0	Sand, tan, time to consie with 10% gavel	Samol	244	278	
]	265	20/36	2.0	consie with 10% gevel	Hendsonu Bkg	3	[3]	
1	1	İ '	1 :	loose, da, sw	,			
		/ 1	, ,	sand, tan Fine laminated, well socted	Reference			
S-7	29.5	11/22/		laminated well socted	Sample	2	8	,
1	31/2	36/42	2,6	to fine to coare	Headspace Bkg	16	12	
				with gravely louse,		•		
		1		1 -)			1 1	
5-8	39.5-	12/29/		Sand, tan, well	Reference			l
ĺ	41.5	39/35	2.5	sorted fine to purty	Scirrple Heirispina Bkg	1	6	
				sorted fine to coase	Merch species 1249	18	7	
				loose, dry			'	
				10050, 60 9	Reference	1		
5-9	49.5-	19/34	2.0	Sand, tan, well sorted	Sample			
i '	51.5	49/36	2.0	to posty sorted time	Hendspace Bkg			
1		, ,,,		to conse with sirver.	ner a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a sur a			
				مددفع والمعامة والمعامة				
}				mothing and brain				
				horizental laurnations				
l				dry to moist, locse			1 1	
l						1		
						1		
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FIE	LD BORING	LOG	Boring No. FTB9102						
Project No 686303 Project Name USATHAMA Page 3 of 3									
Contractor MATHE	S Onler T. CA	CANK Date started 10	122/91 completed (C/72/91)						
Method ASA 4 /4"	Casing Size	HNU 11.7/103) 4 1 P	rotection Level D						
	Soil Drilled 87'	4 below ground \$5 To	otal Depth 89/						
Logged by E. SANDI	N Checked by DRP	Date 10/23/41							

Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	M	onitoring
S-10	59.5- 61.5	15/26 35/40	2.0	well sorted to fine to medium well sorted,	Reference Sample	100°	AIR
S-11	69.5-	16/32	2.0	loose, dry, trace graves		option	Ka
	71,5	28/40	2.0	well sorted with trace govel and horizontal laminations - one zone of well sorted medicin sans with	Kerterence Sample	BYG	gra
	70.6	_		trace graves losse. Slightly mens? SP			
5-12	79.5- 81.5		2.0	sand, tan, fine, to coarse, to gravel, loose, slighth woist well sorted. Sp	Reference Sample	OX3	67.
S-13	87-89	14/26/ 5"	Z ,5	sand, tan, fine, well sorted, no gravel wet, loose	F9102089 Analytico Sample	\$ 3	949
	_			water level in augers 86.5' bgs			
			·	BOB AUGERS 87.0 Last spoon 89.0			

FIELD BORIN	G LOG	BORING NO. FT 3-89-01			
PROJECT NO.: 6049-	64 PROJECT NAME	: USATHAMA- BAAP		PAGE / OF 3	
DRILLING CONTRACTOR:	MATHES	DRILLER: Ed. Clark	DATE STARTED)0/	24/89 COMPLETED 10/2/15	
METHOD: CME-75	CASING SIZE: 4	1 "D TIP ev: \$//	10.6 PROTECTION	LEVEL: D .	
GROUND ELEV.:	SOIL DRILLED: 9	25+ WATER LEVEL: 86 9	54 TOTAL DEPT	H: 4257	
LOGGED BY: BUSS	CHECKED I	BY: P. Bolmer DATE:	11/20/89		

" _

SAMPLE		BLOWS PER	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MCN1	ICRING
NO.	FEET	6-INCHES	REC.	DESCRIPTION	ADVANCE OF BOX 1 NG	TIP	LE
Sit	0-2	33.4°	12/4	Stratisied Sands and 5/1. Black Sinel oil der black to gray, product FILL Note: Breathing zone= 5-pn = bkgd.	2st gravel fill placed over	700	
S* :	2-5-7	1444	15/	Brown to gray med-In SAND and gray brown sitt. Fuel oil odor, moist-wet, No visible product. FILL SM	TIP just above bkgd	27	
S#3	10-12	61232	18/16	brown to gray crose-fine, Sand int Isill + graved moist-wet, No dor FILL. SP			-
İ	1 1		ł	tan med-fine sand 15-165th overgrevel + med-fine SAND FILL SP		Bkg.{	,
3*5	20-22	8 ₁₉ 26 32	19/29	Tan med Sine SAND wt layer of Med to Croe SAND Layer of Med to Croe SAND + Sine gravelat. 21.55t sm dry-moist		BKgd	

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FIELD BORING	G LOG	В	BORING NOFTB-89-01					
PROJECT NO.: 6049-	04 PROJECT	HAME: USATHAMA- BAAP			PAGE '2 OF 3			
DRILLING CONTRACTOR:	MATHES	DRILLER: Ed (Clark DATE	STARTED 10/2	4/89 COMPLETED 10/24/89			
METHOD: Acres	CASING SIZE:	······································	eV: #//	PROTECTION L	EVEL: D			
GROUND ELEV	SOIL DRILLED:	9257 WATER LEV	EL: 86,95t	TOTAL DEPTH:	92 St			
LOGGED BY: Bはっち	CHEC	CED BY: P. Bolmer	DATE: 11/20	F-4				

SAMPLE	DEPTH IN	BLOWS PER	PEN.	OSSERVATION .	COMMENTS ON ADVANCE OF BORING	MCN1	CORING
NO.	FEET	6-INCHES	REC.	50% 31.5 JAL	ADVANCE OF BOXING	TIP	LEL
S#6	318 25-37 30-32	36 46	20/ 24	SAND 25 Tam Median Sine SAND 25 Red brown croe-med SAND wit sine- med gravel & subangular to rounded some bedding in		Bkyd	
5*7	40-42 \$234	¹⁰ 20 22 23.	21/24	mad. In Sund stratisted. SP/SM Tan mad-Sine SAND with med crose sand + gravel layers at processor St. dry-moist Stratisted, SP		Bkgd	
S*8	50-52	15 ₂ 3 9 40	20/	Stratified y 69 41.7+415t JAB- Tan med-5n SAND with med crose SAND layers. 59		Bkgl	
S# 9	60- 4 5	31 31 12 12 13 13 13 13 13 13 13 13 13 13 13 13 13	21/24	Ign, mad-Sine SAND stratisted with this core sand -gravel, byers.		Bky)
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FIELD BORING	LOG		BORING No. FTB-89-0/					
PROJECT NO.: 6049- 0	PROJECT NAME:	USATHAMA- BAAP				PAGE	3 of 3	
DRILLING CONTRACTOR: A	MATHES	DRILLER: Ed C	lark	DATE STAR	TED 10/24	109	COMPLETED 10/24/5	
METHOD: AUTERS	CASING SIZE: 4	4 4	IP eV: /0.0	6	PROTECTION L	VEL:	D	
GROUND ELEV.:	SOIL DRILLED: 97	WATER L	EVEL: 7691	B&S	TOTAL DEPTH:	92		
LOGGED BY: J. Bus	CHECKED BY	1: P. Bolmer	DATE:	11/20/89	,	-		

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SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONITORIN^		
		ł	REC.			TIP	LEL	
S# 10	7072	12 40 50	29/24	Tun med In SAND with some bedding, med-erse sand and gravel layer at 71.75t. (SP)		Bkid		
3 4//	80-82	70 26 30 36	18/24	ian med-sine SANO with some bedding med-crose sand and Fine grave at 81.2 to 81.3 St. moist (59)		Bkgl.		
S#/Z	90-92	4. 34 35	12/24	Tan med In SAND No visible bedding or erse layers. Wet (SP)		Ekg.		
			•	WL = 86.9 St BGS Sand heave 40 89 St BGS 80E = 92 St.				



BORING eder associates, consulting engineers p. c. 85 FOREST AVENUE LOCUST VALLEY, N.Y. 11580 8000 EXCELSION ORIVE MADISON, W. 53717 315 W. HURON STREET, SUITE 220, ANN ARBOR, M. 48104

REPORT

														SHEET OF	<u>১</u>	
DATE STA	VRTED :	6	-6-c	11		DAT	E FINISH	#ED : (2	ما - ر	ء ـ	11		BORING	No. PHM - 9	101	
CLIENT :	0	LIN	COR	PORA	TION									PROJECT No : 814-2		
PROJECT	NAME & L	CATION	N: OL	ص ۱۸	RP. /BA	42	BA	RABOO		PR	epared sy	: I	Jo			
ĺ	CONTRACTO		WTI					LOGGED BY:	D	50			DRILLER :	JOH WEEKS	<u> </u>	
EQUIPMEN	,		CASING :		SC	AL SA	MPLER :	:	COR	E	AUGER	MON. 1	ETT (MM.)	DRILL RIG		
EGUN MEN					SPUT SPOO	N			BARR	D.		MPE	CAP	AND WETHOO)	
TYPE :					STAINLE	\$ \$				-	HZA	Sch. 80 PyC	STEEL			
SIZE :					2 x 24	*					444 ID	4"	6"x7"	w/HSA	•	
HAMMER WT / FAI	ц				140#/30	, "		1	BIT	CA	RBIDE	8"	10"			
SURFACE	ELEVATION	:					SURF	FACE CONDITI	ONS :	A:	SPHAL	T				
WATER LE	EVEL AT		?/, .5		iile Ter Dricci	NG	HR	s. 87,	77	F	. AFTER		24	HRS.		
DEPTH	OVA		TYPE	S/ DEPTH	WPLE			BLOWS / 6		ATA,			RIPTION AND			
GRADE	READIN P P N	ÇS	AND No.	(FROM -	CONTENT	REC	OVERY	OR CORE TIME	EL.	TH / EV.			E=0-10% U1 =20-30% A	FTLE=10-20% ND=35-30%		
0	0.8	,	١	0.25 h	M	5	%	9/19		. <u></u>		HALT	E GRAVE	(FILL)		
1				2.25				18/] ~		·		_	-	,	
						Γ]		4	TLE G	RAVEL	SAND W/		
									ئے [<u>.5</u> ′						
5							***************************************		1		1			_		
	<0.	2	z	5 to	M	7	5%	2/2	1		REE	-BR	N. FINE	SAND		
				7'		Г		3/3	1		'	s/ Tr	ace Gr	avel (SP)		
									1	•						
					1				1							
10							-					٠				
	<0.	,	3	10 to	M	8	۰%	5/=	1		ER.	a. F.	ae Sa	ND W/ TR	ACE	
				12'				2/2	1				EL (Si			
		·						1	ىل [<u>نة'</u>	- CX	GREU	FINE S	AND (Sw)	ı	
] 7	<u> </u>		(STE	ng ocor	- SATURATED)	
15									ן	<u>4.5</u>		NCRE		_		
									1		GR	n - Gr	AY, M-	ESAND FILL)	Ł	
								1	7		6	RA	اور (۱	File)		
i									1		1	No SA	mple)			
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20									1				~			
	10.	0	4	20+0	M	7	5%	17/20						hud w/ Te	BOA!	
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i														,		
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PROJECT	MAME: CLIN	/BA	AP	BORNS	ME PHM	-9101	PROJECT No.	814-2 see 2
DEPTH BELOW GRADE	OVA READINGS (PPM.)	TYPE AND No.	DEPTH FROM - TO	MOISTURE	BLOW / 6" OR CORRE TIME	SAMPLE RECOVERY	STRATA DEPTH / ELEV.	CLASSFICATION AND REMARKS TRACE =0-10X LITTLE=10-20X SOME=20-30X AND=35-50X
				<u></u>				TAN, F-M SAND W/ TRALL
								GRAVEL (SW)
30							}	
ł		 	 	<u> </u>			•	
		 -	 					GRN-GRAY, F-M SAND
İ							1 :	(SLIGHT ODOR - OLD FILE OL?
35			ļ					
		<u> </u>		 				
				 				
<u> </u>								
40			<u> </u>			- 44		
	310.0	5	40 to	<u> </u>	25/32	40%		GRAY, FINE SAND WITEME
l		 	70		45/34			GRAVEL (SW) (MODERATE ODOR)
l								(Milvacite Cook)
45		<u> </u>	<u> </u>					
		 	 	 				
ļ								SAME
_								
50		<u> </u>						
								_
			1					LT. GRAY, FINE SAND WI
,								LT. GRAY, FINE SAND WI TRACE GRAVEL (SW) (SLIGHT ODOR)
55		<u> </u>	<u> </u>					(SCIENT ODOK)
ļ			 	 				
			1	 -	 			SAME
								3
60]				[0.5
	435.0	6	60 +0	<u> </u>	38/L4	75%		LT. GRAY, FINE SAND W/
			62		-5#			TRACE GRAVEL (SW) (MODERATE ODOR)
l								,
65								
		 	 		 	 		
		 	 	 	 -			
	 	 			 		1	SAME
70							1	
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		}	 	 	 	<u> </u>	1	
	}	 		 	 	 	1	SAME
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					ME PHM		-	
DEPTH BELOW GRADE	OVA READINGS	TYPE AND No.	OEPTH FROM TO	MOISTURE	BLOW / 6" OR CORE TIME	SAMPLE RECOVERY	STRATA DEPTH / ELEV.	CLASSFICATION AND REMARKS TRACE =0-10X LITTLE=10-20X SOME=20-30X AND=35-50X
								
	<u> </u>	 						
		 						
80								
	580.0	17	80 40	M	26/35	80%		BRN-GRAY, F-M SAND (SU
			82'		65/91			(STEONG GOOR)
	<u> </u>	-	 					
85								
	710.0	8	85 to	M	30/38	75%	360	GRAY, FINE SAND (SW) STRONG ODOR)
		<u> </u>	87'		83/180			GRAY, FINE SAND (SW)
		 						(STRONG ODOR)
90		 	1			 		
	44.0	9	90 to	W	13/58			BRU-GRAY, F-M SAND (SW)
			95'		التوم		91.5	(SLIGHT ODOR)
								TAN, FINE SAND (SW)
95	<u></u>	 -	 			 		(NO DUBL)
45	<u> </u>	 	 -					
		 	 			l ——		
			 	t			98.0	
							EOB	" = .00/5.0
100								4'4" AUGERS TO 98' FOR
		 	ļ			<u> </u>		PILOT HOLE AND SAMPLIA
		-	 	<u> </u>		}		64" AUGERS BLIND DRILL
		 	 					TO 98' FOR WELL
			 	 				INSTALLATION.
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BORING

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eder associates, consulting engineers p. c.

85 FOREST AVENUE LOCUST VALLEY, N.Y. 11560 8000 EXCELSIOR DRIVE MADISON, W. 33717 315 W. HURON STREET, SUITE 220, ANN ARBOR, MI 48104

REPORT

BORING No. DATE STARTED: 6-4-91 DATE FINISHED : 6-4-91 PROJECT No : 814 -2 OLIN CORPORATION PREPARED BY: DJO PROJECT NAME & LOCATION : OLIN CORP. /RAAP . BARABOO DRILLING CONTRACTOR: WTD DRILLER: JOH WEEKS LOCGED BY: DJO SOIL SAMPLER : MON. WELL (MW) CORE DRILL RIG AUGER **EQUIPMENT:** CASING : BARREL AND METHOD PIPE SPUT SPOON TYPE : HSA STAINLESS D-120 2 x 24" 44ID SIZE : W/HSA HAMMER WT / FALL CARBIDE BIT SURFACE ELEVATION : SURFACE CONDITIONS : ASPHALT 86.5 FT. MILE DRILLING HRS WATER LEVEL AT FT. AFTER HRS. SAMPLE DESCRIPTION AND REMARKS BLOWS / 6" STRATA DEPTH (FROM -TO) TRACE=0-10X LITTLE=10-20X SOME=20-30X AND=35-50X BELOW GRADE DEPTH / ELEV. MOISTURE RECOVERY AND CORE TIME (PPM) ASPHALT TAN SAND & GRAUEL (FILL) 2.8 8/12 0.25 h 50°/0 1' 13/14 GRAY-BLK MOTTLED SILT W/ TRACE SEGR (ML) <u>3.5</u> 5 GRAY-BRN MOTILED SILT (M. 5/8 0.9 5 to 50% 9/14 8' 10 TAN F-C SAND WY TRACE 80% 16/44 0.7 10 to LITTLE GRAVEL (SP) 12' 40/38 15 TAN M-C SAND W/ TRACE 15 to 3° % | 55/68 LITTLE GRAVEL (SP) ' 17 100 20 TAN F-C SAND W/ TRACE-M 60% 350.0 Soto 10/29 LITLE GRAVEL (SP) ಎ೨′ 3o/35 (MODERATE ODOR)

	HAME: OLIA		1	BORING	Na P-1			814-2 SHEET 2 OF 3
DEPTH BELOW GRADE	QVA READINGS (PPM)	AND No.	DEPTH FROM - TO	MOISTURE	BLOW / 6° OR CORE TIME	SAMPLE RECOVERY	STRATA DEPTH / ELEV.	CLASSIFICATION AND REMARKS TRACE =0-10% LITTLE=10-20% SOME=20-30% AND=35-50%
	620.0	6	25 to	M	20/16	60%		TAN F-M SAND W/ TRACE
	<u> </u>	 -	\$7'	ļ	23/25			GRAVEL. BLK SILT IN TIP
		 	╂					of spoon (sw)
30			 					(STRONG ODOR)
	105.0	7	30 to	М	21/37	75%		TAN F-M SAND W/ TRACE
		<u> </u>	32'		5\$/77			GRAVEL (SW)
		 	-					(SUGHT ODOR)
35		-	 					_
	9.6	8	35 to	М	9/20	60%	<u>37.5</u>	TAN FINE SAND (SW)
			37'		31/63		<u> </u>	GRAY F-M SAND (SW)
			ļ					(SLIGHT ODOR)
40								
	240.0	9	40 10	M	16/55	60%		GRAY F-M SAND (SW)
			42'		58/81			(MODERATE ODOR)
		 -						(MOUSEN IE OUSE)
45								
	375.0	10	45 to	м	11/26	50%		GRAY F-M SAND W/TRACE
			47'		49/189			GRAVEL (SW)
		<u> </u>						(STRONG ODOR)
50								(3,12),04 0000)
30	270.0	11	50 to	M	11 /30	60%		
	870.0		52'		41/68	00 70		Same
							F2 5'	
55							<u>53.5</u> '	
35	15.0	12	55 to	M	7/13	60%		- 15 A SAND (5.1)
	75 70		57'		37/59	6078		TAN F-M SAND (SW)
								(NO ODOR)
60	11 -	12	/20		9/5	7-6/	ł	
	11.0	13	60 to	M	8/18 29/43	75%		SAME
					F:/73			•
_								
65								- 0 - 1 -
	58.0	14	65 to	Μ	15/36	75%	66.0	TAN F-M SANC W/ TRACE GRAVEL (SW)
			67'		65/90			(NO ODOR)
								GRAY F-M SAND WI TRAC
70								GRAVEL (SW) (SCIGHT ODOR - OLD FUEL OIL
	160.0	15	70 to	М	16/40	75%		COCION FLODOR - DED FASE DIC
1			7 2 ′		60/79			SAME
75								

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DEPTH BELOW GRADE	QVA READINGS (PPM)	TYPE AND No.	DEPTH FROM - TO	MOISTURE	BLOW / 6" OR CORE TIME	SAMPLE RECOVERY	STRATA DEPTH / ELEV.	CLASSFICATION AND REMAINS TRACE =0-10% LITILE=10-20% SCME=20-30% AND=33-50%
	430.0	16	75 to	M	7/38	60%		GRAY-TAN, F-M SAND (
			77'		45/66			(MODERATE ODOR)
			 		<u> </u>			
80					-			
	650.0	17	80 %	М	10/18	60%		GRAY F-M SAND (SW)
			82'		44/50			(STRONG ODOR)
			 					
85	ļ		 					6
	>/000.0	18	85 ho	M	7/22	75%		DK GRAY F-M SAND (SW) TAN F-M SAND (SW)
			87'	W	56/40		86.5	S4-20 (51)
								I IAN F-M JANUS (SE)
90]							
70							<u>90.0'</u> E0B	
							200	
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All abandonment work shall be performed in apporphings with the provisions of Chapters NR 111, NR 112 or NR 141, Wis, min. Code, whichever is applicable. Also, see instructions on pack. IC) FACILITY NAME GENERAL INFORMATION County Ungmai Weil Cwner (If Known) Well/Drillhole/Borehole Location SAUK N/A Present desire inner **X** : 1/4 of Sec. : T. 10 N. R 1/4 of OLIN CORP. / BADGER AAP (If applicable) Street or Coute Gov't Lot Grad Number HIGHWAY 12 SOUTH Gnd Location City, State, Zip Code £. □ E. □ W. PARABOO . W1 53913 Civil Town Name WI Unique Weil No. SumpteR Street Address of Weil Reason For Abandonment TEST BORING OLIN CORPORATION / BAAP City, Village Date of Acandonment 6-5-91 WELL/DRILLHOLE/BOREHOLE INFORMATION (4) Deput in Water Feet) 86.5 **Drafficre/Borenole Construction Completed On ☐ Yes ☐ No 🛛 Not Applicable (Date) Pump & Piping Removed? 6-4-91 Liner(s) Removed? ☐ Yes ☐ No ☒ Not Applicable BORIN LOG Screen Removed? Yes No X Not Applicable Monitoring Well a Available? ☐ Water Weil ☑ Yes □ No Casing Left in Place? T'e T'e Drillhole If No. Expiain A Borebole Was Casing Cut Off Below Surface? Yes No Did Sealing Material Rise to Surface? ☐ Yes ☐ No Construction Type: □Ye □ No NA ☑ Drilled ☐ Dug Did Material Settle After 24 Hours? Driven (Sandpoint) Other (Specify) If Yes, Was Hoie Retopped? ☐ Ye ☐ No (5) Required Method of Placing Sealing Material Formation Type: Conductor Pipe-Pumped Conductor Pipe-Gravity ☑ Unconsolidated Formation ☐ Bedrock Other (Explain) Dump Bailer Total Well-Depth (ft.) 90 Casing Diameter (ins.) For monitoring wells and (6) Sealing Materials (From groundsurface) Neat Cement Grout monitoring well boreholes only Sand-Cement (Concrete) Grout Concrete Bentonite Pellets Casing Depth (ft.) Granular Bentonite Clay-Sand Slurry ☐ Bentonite - Cement Grout Was Well Annular Space Grouted? Yes No Unknown ☐ Bentonite-Sand Slurry If Yes, To What Depth? Chipped Bentonite No. Yards. 7 Sealing Material Used Sacks Sealant or Volume Mix Ratio or Mud Weight To (FL) From (FL) Surface CONCRETE CHIPPED BENTONITE 90 43 BAGS Comments: (9) Name of Person or Firm Doing Sealing Work FOR DNR OR COUNTY USE ONLY District/County Date Received/Inspected WTD ENVIRONMENTAL DRILLING David 9. Ole Date Signed 6-12-91 Reviewer/Inspector newer/Inspector eiephone Number Follow-up Necessary (608) 836 - 1500 8000 EXCELSIOR DR Ciry, State, Zip Code

eder associates, consulting engineers p. c. BORING REPORT 85 FOREST AVENUE LOCUST VALLEY, N.Y. 11560 8000 EXCELSIOR DRIVE MADISON, W. 53717 315 M. HURON STREET, SUITE 220, ANN ARBOR, MI 48104 SHEET I OF 3 BORING No. DATE FINISHED : 6-5-91 6-5-91 DATE STARTED : PROJECT No : 814-2 CLIENT : OLIN CORPORATION PREPARED BY: PROJECT NAME & LOCATION : OLIN CORP/BAAP DJo BARABOO DRILLING CONTRACTOR: WTD LOGGED SY: DJO DRILLER: JON_WEEKS SOIL SAMPLER : MON. WELL (MW) CORE DRILL RIG AUGER **EQUIPMENT:** CASSNG: BARREL AND METHOD CAP PIPE SPLIT SPOON TYPE : HSA STAIN LESS D-120 44 ID **SZE** : 2 X 24" W/HSA 140#/30" BIT CARBIDE WT / FALL SURFACE CONDITIONS : ASPHALT SURFACE ELEVATION : FI. ATTER DRILLING 88.5 FT. AFTER WATER LEVEL AT DESCRIPTION AND REMARKS
TRACE=0-10% LITTLE=10-20%
SOME=20-30% AND=35-50% BLOWS / 6" DEPTH STRATA DEPTH (FROM AND No. DEPTH / MOISTURE CONTENT RECOVERY CORE TIME GRADE (DPM) 50% 12/21 13.0 TAN SAND & GRAVEL (FILL) 0.25 to ميل_ 37/57 5 RED-BRA MOTTLED SILT (A) 60% 416 10.0 a 5 to M 12/16 <u> 1.5</u>° 10 BRN. F-C SAND (SP) <0.2 60% 3/10 10 to (2" LENS OF BLK CNOSES AT 11") 18/26 15 BRN. M-C SAND WI TRALE 15 to 60% 0.2 M 5/16 - LITTLE GRAVEL (SP) 69 /7L

<u> 21.0</u>

8/35

36/30

TANF-M SAND (SW)

20

25

1.4

20 4

221

M

60%

PROJECT	MAME: CLIN	J /BA	AP	BORNE	m E-3		PROJECT No.	814-2 sect 2 or 3
DEPTH BELOW GRADE	OYA READINGS (P? M.)	TYPE AND No.	DEPTH FROM - TO	MOISTURE	BLOW / 6" OR CORE TIME	SAMPLE RECOVERY	STRATA DEPTH / ELEV.	CLASSIFICATION AND REMARKS TRACE =0-10% LITTLE=10-20% SOME=20-30% AND=35-50%
	0.4	6	25 to	М	13/25	75%		TAN F-M SAND W/ TRACE
			27'		C7 / 100		Ì	GRAVEL (SW)
		 	 					
30		 						
- 30	40.2	7	30 to	M	6/14	75%	į	
			32'		28/38			SAME
35								
	0.5	8	35 h	м	12/27	75%		TAN F-M SANO W/ TRAC
	-		37'		44/60			LITTLE GRAVEL (SP)
								LINCE GROWER (SP)
40	100	9	40 to	M	9/12	80%		
	<0.2	17	43'	700	20/38	30 7 ₀		TAN F-M SAND (SW)
		 	70		Ø0/5A			·
45								_
	0.4	10	45 +	M	18/56	90%		TAN F-MSAND WI
		!	471		90/100			TRACE GRAVEL (SW)
								• -
50		}						
30	₹0,2	11	50 to	М	9/17	75%		_
		 	52'	733	24/49	70 70		SAME
		<u> </u>						
<i>5</i> 5	1.1	12	55 to	М	14/35	75 9/		C - 4:5:55
Ī		<u> </u>	57'	/**	59 191	13 16		TAN F-M SAND W/ LENSE
			<u> </u>					F-M GRAVEL (SW)
l								
60								0
	0.9	13	60 to	M	11/28	80%		TAN F-M SAND W/
			62'		43/48			TRACE C. SAND (SW)
ł								
65								
	0,5	14	65 to	M	13/37	80%		TAN F-M SAND (SW)
1			67'		59/60			IAN FIR SHOD CON
Ī								
_ [
70						0 91		
}	0.3	15	70 to	W	12/16	१०%		—
ŀ			72′		53/4			SAME
ł								
75				-				

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	MANE: CLIN				ж <u>В-а</u> Ішош (ас	T	PROJECT No.	814-2 SHET 3 0F 3
DEPTH BELOW BRADE	OVA READINGS	TYPE AND No.	PEPTH FROM - TO	MOISTURE	BLOW / 6" OR CORE TIME	SAMPLE RECOVERY	STRATA DEPTH / ELEV.	CLASSFICATION AND REMARKS TRACE =0-10X LITTLE=10-20X SOME=20-30X AN0=35-50X
	<0.3	16	75 to	M	11/17	60%		TAN F-C SAND (SP)
	ļ		77'		24/28			
	ļ	 			 _			
80			 					
80	4.9	17	80 to	М	10/26	75%	81.0	SAME
			85'		77/100	75.78		GRAY FINE SAND (SL'
								(SUGHT O DOR)
- -		<u> </u>]	(304), (304)
85		<u> </u>	-					
	610.0	18	85 to	M	12/26	75%		SAME
		 -	1 8/		791-20			(STRONG ODOR)
			†					목
90								
	8.8	19	90 to	W	44/19%	50%		TAN F-M SAND (SW)
		ļ	92'					(NO ODOR)
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WELL DRILLHOUR BOREHOUR ABANDONMENT Form 3300-FB Rev 3-39

abandonment work shall be performed in accordance with the provisions of Chapters NR 111, NR 112 or NR 141. Wis. min. Code, whichever is applicable. Also, see instructions on back. O GENERAL INFORMATION IC) FACILTY NAME Onginal Weil Owner (If Known) County Well/Drillhole/Borehole SAUK Present West Owner 1/4 of 1/4 of Sec. : T. 10 N. R. 6 OLIN CORP. / PADGER AAP (If applicable) Street or Route HIGHWAY 12 SOUTH Gov't Lot **Grid Number** City, State, Zip Code Gnd Location 53913 ft. 🔲 E. 🔲 W. BARABOO, WI Facility Well No. and/or Name (If Applicable) | WI Unique Well No. Civu Town Name SUMPTER Street Accress of Weil Reason For Abandonment TEST BORING OLIN CORPORATION / BAAP City, Village Date of Abandonment 6-5-91 WELL DRILLHOLE/BOREHOLE INFORMATION (4) Depun to Water (Feet) Grand West Drailtore/Borenoie Construction Completed On 88.5 Yes No X Not Applicable 6-4-91 Pump & Piping Removed? (Date) Liner(s) Removed? Yes 🔲 No 💢 Not Applicable BORNG LOG Screen Removed? Yes No No Not Applicable
Yes No on Report Available? Monitoring Weil Casing Left in Place? Water Well ∑ Yes □ No If No. Explain ☐ Drillhole ☑ Borehole Was Casing Cut Off Below Surface? ☐ Yes ☐ No Did Sealing Material Rise to Surface? ☐ Yes ☐ No Construction Type: Drilled | Yes No Did Material Settle After 24 Hours? Dug Dug Driven (Sandpoint) If Yes, Was Hole Recopped? ☐ Ye ☐ Xo Cther (Specify) (5) Required Method of Placing Sealing Material Formation Type: Gendustor Pipe-Gravity Conductor Pipe-Pumped ☐ Bedrock W Unconsolidated Formation Dump Bailer Other (Explain) Total Weil Depth (ft.) 90 Casing Diameter (ins.) (6) Sealing Materials For monitoring wells and (From groundsurface) Neat Cement Grout monitoring well boreholes only Sand-Cement (Concrete) Grout Casing Depth (ft.) Concrete ☐ Bentonite Pellets Clay-Sand Shurry Granular Bentonite Bentonite-Sand Slurry Bentonite - Cement Grout Was Well Annular Space Grouted? ☐ Yes ☐ No ☐ Unknown If Yes. To What Depth? Chipped Bentonite No. Yaras 7 Sacks Sealant or Volume Mix Ratio or Mud Weight Sealing Material Used From (FL) To (FL) Surface CONCRETE CHIPPED BENTONITE 90 40.5 BAGS Comments: (10) FOR DNR OR COUNTY USE ONLY (9) Name of Person or Firm Doing Sealing Work Date Received/Inspected District/County WID ENVIRONMENTAL DRILLING Date Signed Reviewer/Inspector 6-13-91 Telephone Number (608) 836-1500 2000 EXCELSIOR Follow-up Necessary Ciry, State, Zip Code

BORING



eder associates, consulting engineers p. c.

85 FOREST AVENUE LOCUST VALLEY, N.Y. 11560 8000 EXCELSIOR DRIVE MADISON, W. 33717 315 W. HURON STREET, SUITE 220, ANN ARBOR, MI 48104

REPOR	
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SHEET I OF I BORING No. 12-3 6-6-91 DATE FINISHED : 6-6-91 DATE STARTED : PROJECT No : 814 --OLIN CORPORATION PROJECT NAME & LOCATION : OLIN CORP. / BAAP PREPARED BY: DJo BARABOS DJo DRILLER: JON WEEK! BRILLING CONTRACTOR : LOCCED BY: WID SOIL SAMPLER : MON. WELL (MW) DRILL RIG AUGER EQUIPMENT : CASING : BARREL AND METHOR CAP SPUT SPOON TYPE : HSA D-120 STAINLESS SIZE : a x 24° ധ/ HSA HAMMER WT / FALL 140#/301 SIT CARBIDE SURFACE CONDITIONS : ASPHALT SURFACE ELEVATION : WATER LEVEL AT FT. AFTER DEPTH BELOW DESCRIPTION AND REMARKS TRACE=0-10% LITTLE=10-20% SOME=20-30% AND=35-50% BLOWS / 5" STRATA OVA READINGS DEPTH / MOISTURE CONTENT (FROM RECOVERY CORE TIME AND GRADE ASPHALT TAN SAND EGRAVEL (FILL) 0.25° 1.0° 0 40% 9/18 0.25 + LT. BRN. FINE SAND WI ఎ.ఎక 15/22 TRACE GRAVEL (SP) (2" LENS BLK CINDERS) 45 5 RED-BRN. FINE SAND 75% 6/7 a M 5 to WI TRACE C. SAND & GRAN L 7/8 (SP) 10 0.5' BLK CINDERS 60% 3 7/11 10 +0 TAN FINE SAND W/ TRACE GRAVEL (SW) ıa' 3/4 <u>12.5</u> GRAY FINE SAND (SW)
(STRONG DOOR-SATURATED) E0B 15 CONCRETE 20

abandonment work shall be performed in accordance with the provisions of Thapters MR 111, NR 112 or NR 141, Wis. nin. Code, whichever is applicable. Also, see instructions on back. O GENERAL INFORMATION IC) FACILITY Name Onginai Weil Owner (II Anown) County Well/Drillhole/Borehole Location SAUK N/A Present west Owner **X** 1/4 of Sec. : T. 10 N. R. 6 OLIN CORP. / BADGER AAP 1/4 of (If applicable) Street or Route HIGHWAY 12 SOUTH Gov't Lot Grid Number Gnd Location City, State, Zip Code ft. 🔲 E. 🔲 W. ft. □ N. □ S., RARABOO, WI 53913 racinty wen .vo. and/or .vame (if Applicable) Civil Town Name |WI Unique Weil No. B-3 UMPTER Street Address of Wei Reason For Abandonment OLIN CORPORATION / BAAP ENCOUNTERED CONCRETE (FOOTINGS? City, Village Date of Abandonment 6-5-91 WELL/DRILLHOLE/BOREHOLE INFORMATION Original Weil/Drillhole/Borenole Construction Completes On (4) Depun to Water (Feet) ☐ Yes ☐ No 🛛 Not Applicable (D==) 6-4-91 Pump & Piping Removed? Liner(s) Removed? Yes No No Not Applicable BORING LOG Yes 🔲 No 🔀 Not Applicable Screen Removed? ☐ Monitoring Well Resert Available? ⊠ Yes □ No Casing Left in Place? Yα ☐ Water Well Drillhole If No, Explain ⊠ Borehole Was Casing Cut Off Below Surface? U 1/2 U 1/4 ☐ ve ☐ i N/A Construction Type: Did Sealing Material Rise to Surface? Dailled ☐ Ye ☐ No Dug Dug Did Material Settle After 24 Hours? Driven (Sandpoint) If Yes, Was Hole Retopped? ☐ Yes ☐ 1/6 Other (Specify) (5) Required Method of Placing Sealing Material Formation Type: Conductor Pipe-Gravity Conductor Pipe-Pumped X Unconsolidated Formation ☐ Bedrock Other (Explain) Dump Bailer Total Well Depth (ft.) 13.5 Casing Dismeter (ins.) (6) Sealing Materials For monitoring wells and (From groundsurface) monitoring well boreholes only Neat Cement Grout Sand-Cement (Concrete) Grout Concrete Casing Depth (ft.) Bentonite Pellets ☐ Cay-Sand Sharry Granuiar Bentonite Was Well Annular Space Ground? ☐ Yes ☐ No ☐ Unknown 3entonite-Sand Slurry Bentonite - Cement Grout If Yes, To What Depth? Chieped Bentonite N/A ino. Yards, Sacks Sealant or Volume Mix Ratio or Mud Weight Sealing Material Used From (FL) To (FL) Suriace CONCRITE CHIPPED BESTONITE 6.5 BAGS 13.5 Comments: Name of Person or Firm Doing Sealing Work FOR DNR OR COUNTY USE ONLY Date Received/Inspected District/County WTO ENVIRONMENTAL DRILLING Durd 9 Ol 6-12-91 Reviewer/Inspector Telephone Number 8000 EXCELSION DR City. State, Zip Code (608) 836-1500 Follow-up Necessary

BORING

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eder associates, consulting engineers p. c.

85 FOREST AVENUE LOCUST VALLEY, N.Y. 11560 8000 EXCELSION DRIVE MADISON, W. 53717 315 W. HURON STREET, SUITE 220, ANN ARBOR, MI 46104 REPORT

DATE STARTED : 6-7-91 DATE FINISHED : 6-7-91 BORING No. B-4 PROJECT No : 814-2 QUENT: OLIN CORPORATION PROJECT NAME & LOCATION : OLIN CORP. / BAAP, BARABOS PREPARED SY: DJO DJo DRILLER: JON WEEKS DRILLING CONTRACTOR : WTD LOGGED BY: SOIL SAMPLER : MON. WELL (MW) CORE DRILL RIG AUCER EQUIPMENT : CASING : BARREL. AND METHOD CAP PIPE SPLIT SPOON TYPE : **HSA** STAINLESS D-120 2 x 24" 44"ID SIZE : AZH \w HALLIFR "هa / 40[#]/ CARBIDE WT / FALL SURFACE CONDITIONS : ASPHACT SURFACE ELEVATION : FT. AFTER DRILLING 87. o WATER LEVEL AT FT. AFTER STRATA DEPTH / ELEV. DEPTH BELOW GRADE BLOWS / 6° DESCRIPTION AND REMARKS OVA READINGS TRACE-0-10% LITTLE-10-20% SOME-20-30% AND-35-50% MOISTURE RECOVERY AND No. (FROM CORE TIME CONTENT (PPM) 0.25 ASPHALT 0 75% 18/19 3.5 ı M 0.25 + TAN SAND LERAVEL (FILL) 'ءد.د GRAY-BRN METTED SILT (M. BLK SILT FINAL 3") 19/20 5 M 90% 6/10 40.2 SAME 5 to 7' 14/18 10 REO-BRN, F-M SAND (Su (TAW, F-M SOND FINAL 2") 3 60% M 7/12 40.2 10 % 12' 13/17 15 4 50% 15 to 14/57 1.2 м TON SANDEGRAVEL 17' W/ COBBLES (GP) 20 100 20 to NONE SAME ادد

				P SORING		1		
BELOW GRADE	OVA READINGS (PPM)	TYPE AND No.	DEPTH FROM - TO	MOISTURE	BLOW / 6" OR CORE TIME	SAMPLE RECOVERY	STRATA DEPTH / ELEV.	CLASSIFICATION AND REMARKS TRACE =0-10% LITILE=10-20% SOME=20-30% AND=35-50%
		6	25 %		<u> ग्रुं</u>	NONE		
		<u> </u>	' دھ					SAME
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0 -			ļ					
30	- d	-	2		5/5	1 - 9/		
	0.4	7	30 +0	Μ	31/67	60%		TAN, F-M SAND W/ LITTLE SOME C. SAND & GRAVEL
		 			44/41	-		Some C. JANU & GRAVEL
							•	
35		1			7			
	0.4	8	35 to	Μ	20/27	75%		TAN F-M SAND W/ TRACE
			37'		61/74			C. SANDEGRAVEL LENSES
	_	<u> </u>						
40		 				2 37		
	0.6	9	40+	M	11/23	80%		SAME
			421		48/100			·
		 						
45		 						
	0.6	10	45 +	M	9/15	80%		SAME
		1	47'		51/88	0070		SAIRE
Í								
50								
	0.6	1 11	50 to	Λ	8/32	75%		SAME
		ļ	52'		75/19			
		 			 			
55			<u> </u>		, -,- ,			
33		1.0	55)		11 /25	80%		C 3 04 (
	1.6	13	55 to	М	11/29 49/57	8076		SAME
		 	3/		47/3/			
		 						
60								
	0.8	13	60 to	Μ	11/35	75%	61.0	
j	***		62'		59/90			TAN FINE SAND (SW)
ا ــ ا								
65								C - 2 1 -
	0.4	14	65 to	M	12/23	85%		TAN FINE SANDO WI TRAC
		<u> </u>	67'		60/67			GRAVEL (SW)
			 					
-, I								
70		 _			. /:	. •/		
	0.9	15_	70 +0	M	6/25	60%		SAME
		-	72'		60 195			
		1	-			 		
75			} 					

DEPTH BELOW GRADE	OVA READINGS (PPAL)	TYPE AND No.	OEPTH FROM - TO	MOISTURE	BLOW / 6" OR CORE TIME	SAMPLE RECOVERY	STRATA DEPTH / ELEV.	CLASSFICATION AND REMARKS TRACE =0-10% LITTLE=10-20% SOME=20-30% ANO=35-90%
	0.3	16	75 h	М	4/24	80%		TAN, FINE SAND (SW)
		<u>}</u>	<u> </u>		<u> </u>	ļ		
80								
	0.3	17	80 to	Μ	6/15	80 %		TAN, F-M SAND (5W)
			82'		32/72			
_								
85		18	20.		10/19	60%		TAN, FINE SAND (SW
	0.2	1 18	85 to	M	34/48	60 /		TAN, FINE DAND COM
								=
7 o		 					94'	_
, ,	0.4	19	90 to	W	27/96	40%	90' EOB	TAN, FINE SAND (SE
			92'		100			
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A abandonment work shall be performed in accordance with the provisions of Chapters NR 111, NR 112 or NR 141, Wis, lmin. Code, whichever is applicable. Also, see instructions on back. (1) GENERAL INFORMATION KD FACILTY NAME Onginai Weil Owner (If Known) County Well/Drillhole/Borehole Location SAUK N/A Present week Owner **X E** 1/4 of Sec. ; T. 10 N. R. OLIN CORP. / BADGER AAP 1/4 of (If applicable) Street or Route Gov't Lot Grid Number HIGHWAY SOUTH Grid Location City, State, Zip Code £ □ E. □ W. 52913 ft. □ N. □ S.. PARABOO, WI 539
ractury Well No. and/or Name (If Applicable) PARABOO Civil Town Name WI Unique Weil No. SUMPTER Street Address of Wei Reason For Abandonment TEST BORING CORFORATION City, Village Date of Abandonment 6-5-91 WELL/DRILLHOLE/BOREHOLE INFORMATION (3) Original West/Drillhoie: Borenous Construction Completed On (4) Depun to Water (Feet) Yes No No Applicable 6-5-91 Pump & Piping Removed? Linens) Removed? Yes No Not Applicable BORING LOG Yes No Not Applicable Screen Removed? ort Available? ☐ Monitoring Well Water Well Casing Left in Place? ☑ Ys ☐ No Drillhole If No. Explain N/A ☑ Borehole YE No Was Casing Cut Off Below Surface? Yes No Construction Type: Did Sealing Material Rise to Surface? **∑** Dolled Did Material Settle After 24 Hours? Yes No Dug Dug Driven (Sandpoint) If Yes, Was Hole Retopped? ☐ Ye ☐ No Other (Specify) (5) Required Method of Placing Sealing Material Formation Type: Conductor Pipe-Pumped Gendestor Pipe Gravity Unconsolidated Formation ☐ Bedrock Dump Baile: Other (Explain) Total Well Depth (ft.) 90 Casing Diameter (ins.) (6) Sealing Materials For monitoring wells and (From groundsurface) Neat Cament Grout monitoring well boreholes only Sand-Cement (Concrete) Grout . Concrete Casing Depth (ft.) Bentonite Pellets Clay-Sand Slurry Granular Bentonite ☐ Bentonite - Cement Grout Was Well Annular Space Grouned? ☐ Yes ☐ No ☐ Unknown ☐ Bentonite-Sand Slurry If Yes, To What Depth? X Chipped Bentonite No. Yards. Sacks Sealant Mix Ratio or Mud Weight Sealing Material Used From (FL) To (FL) or Volume Surface CONCRETE SOIL CUTTINGS 90 34 BAGS CHIPPED BENTONITE (8) Comments: FOR DNR OR COUNTY USE ONLY (9) Name of Person or Firm Doing Sealing Work District/County Date Received/Inspected WTO ENVIRONMENTAL DRILLING Signature of Person Doing Work Date Signed 6-13-91 Reviewer/Inspector Street or Route Telephone Number 2000 EXEELSION DR (608) 836 - 1500 Follow-up Necessary City, State, Zip Code

FI	ELD	BORING	LOG		Boring No. PBU-11-016
Project No (453-03	Project N	one BAAP	RI/F	3	Page of
Contractor Lugar	Em.	Driver Art P		Date started	10/24 completed 10/24
Mestod Dul will .	Casing Siz			7/102 TIP	Protection Level)
Ground EL	Sod Drille	· 160'	₽ bek	ow ground 85°	Total Depth 140'
Lagged by Calby	Checks	by DRF)	ne 10/26/91	

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Sample No	Depth in Feet	Blows per 6 inches	Pen	Description	Comments on Advance of Boring	Mont	LEL
5-1	0-10			ces sand (sp-GD)	10'	JAR AT	0%
5- Z	10-20			Med-cos sound soul lyour	ł · · ·	0 0	
5-3	20-30			CSP) ers sand + Fine grant	30] (
5-4	32-40			(5P-6P)	40'	1111	1
5-5	43-50			Med-cos sound some thin grant			{
5-6	50-60			layers			
5- 7	60-70			(5P)			
5-8	70-80						
5-9	80- ५०				<u>D</u> 85	1	
5-10	90-100				_		
5-1l	190-110			Gravel, cobbles + crs 3:nd	49'		
5-12	110-129			Grand, cobbles + crs 3:and posely 3orted (57-62)			
5-13	120. 130			Fine Med Simd	115		
5-14	130-140			some this grewl layers			
5-15	142-150			(5P) 1			
	150-160			<u> </u>	Bot Ils'		
			·				

5-1 0-10' 5-2 10-20 5-3 20-30 5-4 30-40 5-5 40-50 5-6 50-60 5-7 60-70 5-8 70-80 5-9 90-90 1-10 Median - Course At 100' struct t Cubbles to 115 Felow 115 med Sand w/ Some Coarse simel
B.O.E. 120'

FIEL	D BORING	LOG	Boring No. PBN-91-02
Project No (853-03 Pr	DIECT Name RAAP	RIFS	Page or
Contractor wine	Driller Art 8	Date started	9-30 completed 9-30
Method Diral - Wall Ca		HNU 11.7/10.2 TIP	
Ground EL So	el Drilled 170'	4 below ground 85	Total Depth 160'-170'
LOGGED BY BULLY COLLY		Date 10/10/41	

Sample Depth in Blows per Pen Description Comments on Advance of Born	Monitoring HNU LEL
0-10 10-20 20-33 30-40 5AND Poscly Sorted (SP) 50-60 112 60-70 112 60-70 113 70-80 8-10 90-100 5-12 110-120 5-13 120-130 5-14 130-140 5-15 140-150 5-16 150-160 5-17 160-170 Brown-Tam Fine Median SAND Poscly Sorted (SP) Some fine grant tayers of Fine grant to conse sand, grant to cobble 98-109' Mod-crs SAND (SP) Some layers of grant The fine of the cobble 98-109' Mod-crs SAND (SP) Some layers of grant The fine median SAND Sorted SP) Some layers of grant B.O.E. 170'	JAR AIR 0%

Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	MOI	nitorng
5-1	0-/0'			Brown-Ton Fn-Med SAND (SP)		JAR A BUE	IR 0%
5, 2	10 -20			Similar to S-1			
1	20- <i>3</i> 0			Latin /			
4	30-40						
S-5	40-50						
g-6	50-60			Tan In SAND wit/ little Medium Sand (SP-SW)			
s-7·	60-70				_		
5-8	70-80				I 280°		
5-9	४०-१०			Tan Med & SAND at 95' crs grave			
S-10	90-07			and collies. 70 105'			
	אן-בסן			below 105 med-use sand wt little gravel tobbles.			
		·		B.O.E. 110'			

FIELD	BORING	LOG	Boring No. PBV-11-63
Project No L 653-03 Project	Name BAAP	RI/S	Page of
	Driver Act	Date started 9-	27 completed 9-27
Method Hamman Casing	Size 4"OD	HNU 11.7/10.2 7/2-5 PT	otection Level ()
Ground EL Soil On	Med 150'	4 below ground 79' To	tal Depth 150'
Logged by Bully City Che	ted by DRP	Date 10/10/41	

Sample	Desth in Feet	Blows per A	200	Description	Comments on Advance of Boring	Monitoring HNU LEL	7
	0-50		-	Beam. Tom Fine med SAND (37)		JAR AM 0%	
Pall-11-03B	50-80			Tan fine Sand Some Madim Sand			
See Part	80-100			(SP-SW) Tan Med-course sand changing to course simple transing to course simple gravel to 105'	<u> </u>		
5-12	110-120	-		Tan Med-course sand			
5-13	120-130			Some small gravel			
5-15	140-150			BOE 150'	·	777	
		·					

FIELD BORING	LOG				BORING NO	. PB	M-90	-0/10
ROJECT NO.: 6298-11	PROJECT NAME:	USATKAKA-	BANP FS			PAGE	/ QF	4
BRILLING CONTRACTOR: LAY	NE SOUTHWEST	DRILLER:	GRady	DATI	STARTED P/2	3/90	COMPLETE	8/24/90
HETHOD: DUAL WALL	CASING SIZE: 9 IN.		TIP eV:		PROTECTION I		n	-7-1/10
CROUND SILEY.:	2017 DELITTED: 31	7.0'	ATER LEVEL:	66.0	TOTAL DEPTH	21.	20'	
LOGGED BY: TBU	SS CHECKED BY	r: P. Bol	wer	DATE: 9/2	8/90			

S#/	0-10-5		REC.	DESCRIPTION	ADVANCE OF BORING		
S#/	0-12					TIP	LEL
	- / 39			Black organic topsoil gradu to dark brown Sine Start Sand + Sitt 0-85t Tan Sine-med Sand with occ. gravel 8-109	Chango 851		
S#2	10-20		1 1	med fine SAND little Sift.	•		
5*3	20-30		SP Sn	med fine sand, stratified with crose- med sand			
S*4	30-5/0	·	SM	Tan Med-InSAND		·	1
S#5	40-50			Tan Creeto Sn SAND tree Sine gravel.			
S#6	50-60		sni	an med-In SAND, similar	-		
5#7	60-70		m	an med-Sine SAND with			

FIELD BORING	LOG			BORING NO	· PBM-	-90-01C
PROJECT NO.: 6298-11	PROJECT NAME:	USATHANA- BAAP FS			PAGE 2	OF 🛠
ORILLING CONTRACTOR: LAY	NE SOUTHWEST	DRILLER: C. R	dviques	ATE STARTED 8/2	3 000	ETED 8 34/90
METHOD: DUAL WALL	CASING SIZE: 9 IN.	TIP	w: TE#2	PROTECTION	LEVEL: D	
GROUND ELEV.:	SOLF DELFTED: 31	7.0' WATER LEVE	il: 86.0	TOTAL DEPTH	217,0'	
LOGGED BY: J BUS	S CHECOED BY	1: P. Bolow	DATE: 9/0	18/50		

SAMPLE	DEPTH IN	BLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF ECRING	HONI	TCRING
NG.	PERI	a. IMPLE2	REC.		ADVANCE OF BOX INC	TIP	LEL
S#8	70-803	,	5M	Tan Med Sn SAND V. moist	-		
				possible thin sitter cemented layer of v. Sn sand at ~805t.	changeat	80	
3#9	80-905	7	mi	Brown fine silt balls" From 80-83 St then grading to cree to sine Sand with increasing	change at ?	3	
C# (c	00-100			gravel to 90 St. med-sn SAND becoming	adabasest	Ю	
9-10	90-100	•	\$M	coarsevat 97 St	change at 9.	57.	
5 + 11	100-110		Sρ	Into cuse gravel	change at 10		
3412	110-712		σP	croe-Med SAND with excasional gravel			

FIELD BORIN	G LOG		E	BORING NO. F	PBM-90-010	>
MECT NO.: 6296-11	PROJECT MA	ME: USATHANA- BA		PAG		
MILLING CONTRACTOR: L	AYNE SOUTHWEST	ORILLER: 6	Rodrianez DATE	STARTED 8/23	COMPLETED 6/34	90
ETHOS: DUAL WALL	CASING SIZE: 9 IN		TIP WY TE #2	PROTECTION LEVEL	: D	
ROUNG ELEV.:	SOIL DRILLED:	2120 WATE	LEVEL: 86.0	TOTAL DEPTH:	2120'	
LOGGED BY: J BU	CHECKE	D BY: P. Bolow	_ DATE: 9/38	190		

SAMPLE NO.	DEPTH IN	ELOUS PER 6-INCHES	PEN.	DESCRIPTION .	COMMENTS ON ADVANCE OF BORING	IMON	CRING
	PEE!	G-INCHES	REC.	DESCRIPTION	Advance of Boxtag	TIP	LEL
5*/3	120-130		'	Med-Sn SAND trace gravel	· :		
5#14	130-140	·	SP	Med-Sa SAND with some crse SAND thin gravel layer At 135 St.			
S# 15	/ 40-Iso		50	Med. Sn SAND with tree crose Sand + gravel	·		
5#16	/50./60			Med-In SAND			
] 54	160-170		3/2	med-En SAND	· ·		,
ี่S₹/8	170-180		50	Med on Sand little evse sand and ongravel.	·		
5*19	180-190			med In Sand wt/Tree grayel. Med to In gravel	change at 18	57	
l Z#20	/90-200	•	حرى	with erse sand at 1895t. crse-med SAND and grave (well rounded) becoming med to erse gravel at 200-5%.			
		•					

•

FIELD	BORING	LOG			BORING	NO. PBM-98	2-0	
MOJECT NO.	.: 6296-11	PROJECT	NAME:	USATHAMA- BAAP FS		1	* 4	
KILLING C	ENTRACTOR: LAY	NE SOUTHWES	IT	DRILLER: G. Rogriquez	DATE STARTED &	23 00018	TED 8/	24
guico: Dr	AL WALL	CASING SIZE:) NL	TIP W: 4 Est	2 PROTECT	TON LEVEL:		
SECUMO ELE	/.:	SOIL DRILLED			TOTAL O	EPTH: 217.0		
.060ED SY:	JBus		CCED 87	: P. Bolmer DATE: 9	124/90			
		•						
SAMPLE NG.	DEPTH IN	BLOWS PER 6-INCHES	PEN.	DESCRIPTION		COMMENTS ON ADVANCE OF BORING	MONIT	TCRING
	res.	O INCILS	REC.				TIP	LEL
5471	200-210		SP	& crse gravel +	-cobbles			
U74				well rounded u	ith tree	·		
				med- Fine gra	vel.			
						Change ~210		
				, , ,	-nn/n			
5422	210-22	b	SP	end crose to Fn	274702			
	·			wt/some gran	NU	change at 2	52	17
				bedrock-sn	Sitty brown			`
				Sand Stone-	/			
				No water as	Ided to			
				1/1 - 60/e				
				77115 1010				
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j								
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FIEL	BORING	LOG			BORING I	NO 23M-90-0	02 <i>D</i>	
OJECT H	0.: 6296-11	PROJECT N	ME:	USATRAMA- BAAP FS		PAGE / C	² 2	ا ر
DRILLING	CONTRACTOR: LAY	NE SOUTHWEST		DRILLER: 6- Rodriguez DA	TE STARTED 8	17 COMPLE	TED Z	
HETHOD: D	UAL WALL	CASING SIZE: 9	N.	TIP W: TEA2	PROTECTI	ON LEVEL:		-8/19
GROUNG EL	EV.:	SOIL DRILLED:	4		TOTAL DE	PTH: 2/0		,
LOGGED SY	: I Bus	Z CHECK	ED 87	: JAPA DATE: 8	13. 9/	28/90		i
				P. Bolins	<u> </u>			
SAMPLE NO.	DEPTH IN	BLOWS PER 6-INCHES	PEN.	DESCRIPTION		COMMENTS ON ADVANCE OF BORING	MONI	CRING
L		J-1ACACS	REC.	, , , , , , , , , , , , , , , , , , ,			TIP	LEL
S# /	0-10		SPE	In Topsolover by Sn. Sand Tree quavel				
5#2	10-20			brn med-fn SANZ				
5#3	20-30	i		tan mel-In SAN	İ			
15#4	30-40		50	med-In SANO, . grave/layer at.	with Sine 35 st	_		
5#5	40-50	•	50	med-In & SAND, a layers From 45-5	navel 50 st.			
S#6	50-60			tan med 5 n SAI trace sitt and gr				
5#7 '	60-70		50	tan med- Fine San	dtre	,		
,5≠18 ! :	70-80			I tan med-In Sand gravel thin, cement Zone at 175 St water table, some gravel below water to 805t.	with crse,	change at 72 Chia sitt bed		
,5#9	80-90		- ρ	tun-gray med. In. with tree to little 9	SAND	·		

	BORING		NAME:	USATKANA- BA	up FS	100		O. PB)F 7	
DRILLING C	ENTRACTOR: LAY				Rodriquez	DATE STA	RTED 8/	7/90			119
ETHOD: DO	JAL WALL	CASING SIZE:	9 M.		TIP ev:			N LEVEL:		27	
ROUND ELE	V.:	SOIL DRILLED	: 2	WATER	LEVEL: 29.8		TOTAL DEP	TN: 2/	9 4		
.0GGED 87:	J. Busi	S CHE	COCED BY	: P. Bol			- 18/	90	-2		
	,				> 9/28/9		/				
SAIPLE NO.	DEPTH IN FEET	BLOWS PER 6-INCHES	PEN.		DESCRIPTION			COMMEN'		MONI	TCR INC
			REC.	<u> </u>	· · · · · · · · · · · · · · · · · · ·					TIP	LEL
S# 10	90-100		SP-	90-95	st Med.s 1< gravel.	n SH	MD	chang	ie at		
			}	WI 1111	e gravel.	1007	1	95 \$	7		
				<i>i .</i>	and wan		, ,				1
				becomi	ng coarse	er al	,~~ 5 /.				
*//	100-110		_ ^	1 - 1 -	Sand witch						
			30	+ CHIO	sand witch	5e 20	17 7				
	4			11111	gravel. to S#11						
#/2	110-120		20	Similar	To 5411						
J#12	/10-120 120-130		SP	Similar	- to 5#11		}				}
#,4	130-140	ı			to 5#//						
Í	140-15	,	2	3////	- to S#//	/					
15	1		PP	Similar	- 76 S*//	//					
#16	150-160		50	med-sn	Sand with	n crs	e				
. , _			<u> </u>	Sand, M	love avav	elat	1655			: ! 	
1			l i	(Since av	avel.						
#17	160-170			Cvea-Fi	esand w	t little	eque	₹/			
ł		•	ا ا	~ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	4: 5017	L	/				
418	170-180			Similar	to 5#17						i I
*19	180-190		20	120-185	similar to crse grau	5#1	7	Zhan	ae al	185	
		<	6P	185-190	erse drav	140	bblet	_ (ر		
	200				J	1	11/1	1.0-	,,		
	90-200		SP	very ers	se gravel a	nd ed	bolesai	7 145	<i>Ff.</i>		
#21	200-200		51/	206-205	gravel cobb	KZO.	nes	A			
{		-	المحر	205-21	med-cr	5 e 5a	inda	H			
İ				Some	gravel.		T		ļ		

BORING NO. PBM - 90 - 03 D FIELD BORING LOG PROJECT MANE: USATHAMA- BAAP FS PAGE | HOLECT NO.: 6296-11 DRILLER: G. Rodingues DATE STARTED \$/7/40 COMPLETED 6/16/90 DRILLING CONTRACTOR: LAYNE SOUTHWEST TIP W: TE =2 CASING SIZE: 9 IN PROTECTION LEVEL: > HETHOD: DUAL WALL WATER LEVEL: 72.7 (muss) TOTAL DEPTH: 205.0 ZEIL DEILTED: 802.0 CROUND ELEV .: LOGGED ST: C. Morre CHECKED BY: P. Bolma DATE: 8/7/98

		·	uscs				
SAMPLE	DEPTH IN	BLOUS PER	PEN.		COMMENTS ON	MONI	TORING
MC.	PEET	6- INCHES	REC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
۱-کہ	curfoce	иА	SP	1 . 8		٥	
s-2	16'	NA	SP	Brown, fine to med sand, poorly graded, dama			
s-3	'ه ج	£1	SP	Some as above	,	: !	
4 - و	30,	10	sp	mare gravel			
5-5	40'	·	5°.		Note: no hammer needed		
5-4	50'		SP	Same as above	E dure		
s -7	40'		s۴	Tan, five to medow, poorly graded, damp	میلیم <i>س</i> م		
s-8	70'	•	se	sume es above	change		
5-9	80'	. · · 	SW	some gr., well rounded well graded (all siges,	~ 75'	0	

FIELD BORING	LOG			BORING NO). ၉၉	m - 9	10-0	30
PROJECT NO.: 6296-11	PROJECT NAME:	USATHAMA- BAJ	u FS		PAGE	2_	OF	3
DRILLING CONTRACTOR: LAY	NE SOUTHWEST	ORILLER: G	Rodriguez	DATE STARTED 8/7	190	CDM	PLETED ,	5/16/9
METHOD: DUAL WALL	CASING SIZE: 9 INL	-	TIP W: TE T	2 PROTECTION	LEVEL:	A		
GROUND ELEV.:	SOIL ORILLED: 205.	STAW C	LEVEL: 72.7	TOTAL DEPT	1: 20	50		
LOGGED BY: C MUTT	CHECKED BY:	P. Bolme	DATE:	8/7/90				

SAPLE NG.	DEPTH IN	SLOWS PER 6-INCHES	PEN.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	MONI	TCRING
		U TAGES	REC.			TIP	LEL
S-10	20'		sw	Brown, friets med so U/ littlets some crass so ! gard - wet planee (4)	(producing)	
S-11	100'		SP	rown, finite med sa w/ hitthe gravel - wet	- Stilling soft	-	
s-12	110'		50	Tan, fine tomed so w/ trace of gravel, dryer then above			
.s-13	120'		sp.	Brown, fuit med as u/ some coarse sand, trace gr., paturated			
5-14	130		50	Same as above			
8-15	140'		se	same, with slight merease in coarse praction	Change C		
5 -1 la -	150'		SW	same, with slight merease in crows paction which some course sand I some growel (definitely more ground than above). Varietted in sign and advent			
5-17	160'		50/ 5 N	Same as above up de ease in gravel			
5-18	170'	. -	SW	Same as above			

FIELD BO	ORING	LOG		`		В	ORING	NO. PA	3M-90	-031	7
HOJECT NO.: 6	296-11	PROJECT	NAME:	USATHANA- BAA	u FS	<u>.</u>		PAGE		× 3	
DRILLING CONTRA	CLOS: LAY	NE SOUTHWES	τ	DRILLER: 6.	Rodriguez	DATE S	TARTED 8	17/90	COMPL	TED S.	-16/93
METHOD: DUAL V	WALL	CASING SIZE: 9	INL		TIP W: TEF		PROTECT	ON LEVEL:	۵		
CROUNC ELEV.:		SOIL DRILLED:			LEVEL: 72.	ץ '	TOTAL DE	EPTH: 20	05-01		
LOCCED SY: C	mo	A BURGHEO	CED, EY	r: P. Bother	DATE:	<u> 44</u>	P 8/16	ho			
		, .	·		C) 9/28/5	<u>ට</u>	. /			,	
	PTH IN EET	BLOWS PER 6-INCHES	PEN.		DESCRIPTION			ADVANCE (NTS ON OF BORING	TIP	LEL
S-19 3-20 19 2-21 2-22 2	. •		SP SP	Sine med gravel co fine med gravel Gavel co Sine med bed voc	relocated with a Sand with oblide zon Sand with 95-1835 ble zon 20 h at 20 are oring.	4 tree - 6 183 0-2 55.	-1.111- 0-95\$1. 1.111- 0-200\$ 05\$1	/			
		. 			•						

FIELD BORING	LOG	•		BORING NO	D. PB1	V-90-04B
PROJECT NO.: 6298-11	PROJECT NAME:	USATHAHA- BAAP I	r.s		PAGE	of 2
DRILLING CONTRACTOR: LAYE	E SOUTHWEST	DRILLER: G. A.	diquez	DATE STARTED 8/6/	90	COMPLETED 8/6/90
HETHOD: DUAL WALL	CASING SIZE: 9 IN.		20	PROTECTION	LEVEL:	a
GROUND ELEV.:	SOIL DRILLED: 130	MATER L	EVEL: 90,5	TOTAL DEPT	1: /30	·
LOGGED BY: P. Bolmer	CHECKED BY:	P. Bolmer	DATE:	9/28/50		•

إرجرج

SAPLE	DEPTH IN	BLOWS PER	Pr.		COMMENTS ON	MONI	TORING
MC.	PEET	6- INCHES	AEC.	DESCRIPTION	ADVANCE OF BORING	TIP	LEL
	Sufece	NA	sp	Brown med to Fi su , to c , ogain, poorly graded , damp	·		
5-2	16		1.	Brown med to Fi se tre poorly graded, da-p			
5-3	20'		SP	Tou med to Fish, Tru, Tr fi gravel poorly graded, damp			
	30'		sp	Jan Fi to med su, Trc, pools gended, dans			
5-5	40'			As above			
5-6	50		1	As above			
5-7	60'		59	I am med to Fi sa, to a poorly graded, dang	·	-	
5-6	20'	-	50	Ten med to Fise, to c, poorly greated, day to most			
5-9	60'.		s.P	As above v/inct in mostare			
5-10	40		sp	Ac above	D 296 Inct		
5-1i		,	sw.	I can Sundy general, so is med to fi Tre, soul is well country poorly suched	1-3 Course		
	,						

FIELD	BORING	LOG		·	BOF	RING NO	O.PBN-90-0	MB	
PROJECT NO.	: 6296-11	PROJECT	NAME: USAT	HAVA- BAAP FS				, 2	
DRILLING CO	MITRACTOR: LAY	NE SOUTHWES	T DRIL	LER: G. Badiguez	DATE STAR	TED S/G/		TED 8/0	6/90
METHOD: DU	AL WALL	CASING SIZE: 9	PL.	TIP W: TE		PROTECTION	rever: 0		
CROWN ELEV		SOIL DRILLED:	, , , -			TOTAL DEPT	H: /30'		·
LOGGED SY:	P. Bolmer	CHEC	DED BY: P.	Bolmer DATE	: 9/28/90	>			
		·	425						
SAMPLE NO.	DEPTH IN PEET	SLOWS PER 6-INCHES	AET.	DESCRIPTI	CN _.	j.	COMMENTS ON ADVANCE OF BORING		TORING
<u> </u>			1. [1]		TIP	FEF
5-12	110'	NA	10 U	erige to D, Grecelly se to Fi se, poorly grades uncled, setmoded	adjec is med	4 to			
			00	م الما و المعلم الما الما الما الما الما الما ال	Grace 115 W	`''			
		1	1 1				e=119-120		
	,			in Sand, gravel, solly graded, Gracel is a		t. []	ing to at well		
5-13	lao		561 00	on Jandy Grandly 3	11 104-ded		This grant)		
			15P 5	huked	,		, ,		
İ							o'ns one man		
_	130		10 16	and to Fisc, The de, Schooled	Fr c, poorly	1,0	" to confirm		
5-14	100		جرد عرد	de, saturated	, ,	اخا	wuligrophic &		ļ
				•					
			Bo	S E 132'		975	dd 2 460 gals		
						יפו	4 0		
j						ad	od 2 300 gals		
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FIELD BORING	LOG	ВС	PRING NO. PR	N-90-040
PROJECT NO.: 6296-11	PROJECT NAME: USATNANA- BA	M FS	PAGE) of 4/
DRILLING CONTRACTOR: LAYN	E SOUTHWEST DRILLER:	Rodigue Z DATE ST	MATED 6/2/90	COMPLETED 5/5/50
METHOD: DUAL WALL	Casing Size: 9 m.	TIP W: TE 100	PROTECTION LEVEL:	0
GROUND ELEV.:	SOIL DRILLED: 2320' WATE	R LEVEL: 90.60 by5	TOTAL DEPTH:	237.0
LOGGED BY: P. Bolme	CHECKED BY: P. Boliver	DATE: 9/28-	90	

SAMPLE NO.	DEPTH IN	BLOUS PER 6-INCHES	想	ACCOMMODITION AND ADDRESS OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF T	COMMENTS ON ADVANCE OF BORING	I KON	TCRIN	
	766.	G-1mags	let.	DEALITY (100)		TIP	LEL	i
5-1	Serfece	AUM	SP	Dark brown med to hi sand, Tr hi gr, poorly gended, dump SP	AC ≈3'			
5-2	10'		SP	Ten to light ten Filomed To Send, poortygredel, damp	,			!
5-3	ఎ ం`		1	As above	·			
5-4	30'		59.	As above w/ inc ingrat				
5-5	40		SP	Tou to light = saftr mede, party g a, dam, Buch				i
5-6	50		s٩	Tow med to Ti se, to Fi 50, proporty graded, deep to not	·			İ
5-7.	60'		sp	I am med to Fi sa, Trasa, poorly graded, day to mait				1
5-8	70'		sρ	Tam and to Fi Su, perly goods dung to noist	·			

FIELD BORING	LOG	-		ВС	RING NO	. PBN-9	0-040	
PROJECT NO.: 6296-11	PROJECT NAME:	USATHANA- BA	ap FS			PAGE 2	OF L/	
DRILLING CONTRACTOR: LAY	NE SOUTHWEST	DRILLER:	Raliguez	DATE S	MIED 8/2/90	o 60	PLETED 8/5-/50	
HETROD: DUAL WALL	CASING SIZE: 9 NL		TIP W: TE	10.0	PROTECTION L	EVEL: 0		
GROUND ELEV.:	MIL DEILLED: 23	? o' WATE	R LEVEL: 90.0	00 bas	TOTAL DEPTH:	3370		
LOGGED BY: P. By	CHECKED BY	r: P. Bolme	DATE:	9/28/	90			

Canal 5		I avere see	<u>usc 5</u>	1	Computer Au		700 ****
SAPLE NG.	PEET	6-INCHES	4.	DESCRIPTION	COMMENTS ON ADVANCE OF BORING	TIP	LEL
5-9	80'	NA	SP	Simile to 5-8 W/ rich			
510	90'	NA	SP		Be 95		
5-11	100'			And To Marine,	# 90.6-8/3/40 U/prote		
			9/ /su	For sandy givel, surs med to be, to cs, port to med gradel,	102109		
5-12	lιο		GP SSO.	Greatly Send, sa is mad to Fito could greated, schooled End of Day	this could be the grave! 20m for the skellow well		
5-13	120'		שצ	Varigated Gravely Sand, so is medul some Fi so , poorly graded, salwanted	De= 122		
5-14	130		9/ 5w	Tou med to Fisa, some corre, moderty to well graded, strended			
5-15	140'		SW	The med to Fish someware, well goded, To Figr somewhel	•		
5-16	150	· · ·	కళ	Jea and to I: see, little rouse, authority, godod, saturated	•		

FIELD BORING			BORING NO. PEN-90-040
	The second second	HAMA- BAAD FS	
BEITTING CONLEYCLOS: FY	YNE SOUTHWEST DRILL	LER: G. Rodiguez	PAGE 3 OF
METHOD: DUAL WALL	CASING SIZE: 9 ML		DATE STARTED 6/3/90 COMPLETED 5/5
ROUND ELEV.:	SOIL DRILLED: 2320'		O.O PROTECTION LEVEL:
DEED SY: D. Bolme	CHECKED BY: 0 (WATER LEVEL: 90.60	bs TOTAL DEPTH: 237.0

SAPLE	DEPTH IN	BLOWS PER	455				
NG.	PEET	4-INCHES	APC.	DESCRIPTION	ADVANCE OF BORING	MON	ITCR INC
$\frac{1}{5-in}$	160	1 414				TIP	LEL
! ,		NA	SP	Icu med to I-is Trc, pocily graded, saturated	Adding Had 2 600 5cls 5 1,64 5chrence with 1 and 1 making on TE		
5-18-			140	as above	0700-7 Adding 4,0		
5-19	160'	*		Verigetical Growth Send, Se is 5/3/6 much to hi, much granted set and selection will granted, Setweeted	500 gals	10	180'
					1615 added = 300gals		
5-20	190'	<i>s</i>	sp t	Ucregated sandy good, se is ned of property of property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the	Added = 300 gals		
5-21 3	200	* 6	10	crigated growth sand sale is not Li w/som coare, exclarated, good Fi to Come well and attracted	adha = 300gal		1
-27- 2		-6u	, 4	te about	eddod ze zesel		ļ
-23 2	20	GW	A	s above	addre = 7005cl		1.
							ļ

BORING NO. PON-90-040 FIELD BORING LOG NOJETT NO.: 6296-11 PROJECT NAME: USATHAMA- BAAP FS DRILLER: G. Radi BRILLING CONTRACTOR: LAYNE SOUTHWEST DATE STARTED 8/2/90 PROTECTION LEVEL: CASING SIZE: 9 INL HETHOD: DUAL WALL SOIL DRILLED: 2370 WATER LEVEL: CROUNC ELEV .: TOTAL DEPTH: 90.60 2320 CHECKED ST: P Bolme LOGGED BY: P. B DATE: DEPTH IN SUPPLE BLOWS PER COMMENTS ON MONITORING 6-INCHES DESCRIPTION ADVANCE OF BORING SEC. TIP LEL SP redently gracied, schooled de = 234 5-24 230 5-25 Sul Ton med to Fi su some course, 150 vell graded, suturated 236 Rakatz 236 BOB @ 237 . 2 3400 gels

FII	ELD BORIN	IG LOG	Boring No. 5WN-91
Project No 6853-03	Project Name 844	P RI/FS	Page
Contractor Layne	Envison Driller A	of R Date star	Ted 10/15 completed 10/15
metrod bul will	Casing Size 94 00	HNU 11.7/10.2 TIP-	#5 Protection Level D
Ground El	Soil Drilled 120	below ground	35' Total Depth 120'
Logged by Culby	Checked by I	PP Date 10/16/	191

Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	MO	nitoring U LEL	
	0-10			Tan Mod-cos sand		JAR	UR 09	7
	10-20			some then layers		0		
•	20-30			of gravel		$\ \ $		
	30 - 40			(57)	<u> </u>			
	40- 20	,						
910	50-60							
5 m/- 91 -01 B	60-70			V				
3	70-20				7 6-1			
3	80-90				₹ 85′			
98	90- 100			Gonol, cobbles + crs	15			
18	100 -40			(5P-GP)				
	110-120			Med-cos sund (SP)	115			
				·	BOE 120'			
						1 1		
					İ			
								į
ı								
			1			•		

FIEL	D BORING	LOG	Boring No. SWATHAR
Projec: NO (25) -03 Pr	DIECT Name BAAP	RI/FS	Page(ot/_
Contractor buyne Em		R Date started W	(L completed 10/16
المد المر مومه	mand 2rse 4, 0D	HNU 11.7/10.2 TPd5 P	
Ground EL	oil Drilled 170'	4 below ground 85" To	otal Depth 170'
Logges by Colby	Checked by DRP	Date 10/17/91	

Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring HNU I LEL
	7- 10 10 - 20 20 - 30 30 - 40 40 - 50 50 - 60	6 inches	Rec	Fine-cos SAUD some cabbles EP-GP TAU Fine-Mad Sand Some thin layers of grave1 (P) Med-cos SAUD Some thin layers of grave1 (SP)	7'	
10-11-11-5 5-55	70 - 80 80 - 90 90 - 100 100 - 110 110 - 120 120 - 130 130 - 140			Cros SAUD Cabbles + Gravel (SP-CP) Med - Crs Sand (SP)	7 85' 15'	
	140-150 150-160 160-170	·			B0E 170'	

FIE	LD	BORING	LOG		В	oring	NO.544-41-00
Project NO 6953-03	Project N	arne BAAP	RI/FS			Page _	1_01
Contractor Layer		Driller A-+ R		Date started	10/14	comple	ted taky
Mesnos History	Casing St	ze 4" 0D	HNU 11	7/102 TIP#5	Protect	tion Level	D
Ground EL		2201	T per	ow ground 45°	Total D	epth 720	
Logged by Buly cult	Check	ed by DRF) Di	10/15/91			

Sample	Depth in Feet	Blows per	Pen	Description	Comments on Advance of Boring	Monito	
No	}	6 inches	1	Fine- ces stuly some cubbles		TAR ATR	UEL OP
5-1	0-10			(58-67)	7'	a 2	1
5-2	10-20			TAN Fire-Mod SAND C		17 1	
		Į.		some than layers of		11 11 1	
5-3	20-30			gravel		11 11 1	l
				med - crs SAND C	3'3	11 11 1	
5-4	30-40			Some thin layers of		11 11 1	
3-5	40-50	j		1 garace		11 11 1	
	50-60			(sp)		$\parallel \parallel \parallel \parallel \parallel \parallel$	
5-6	55.00		1	1		HHH	
5-7	60-70					14 141	*
	70 - 80			1	卫85	1 []	
5-8	<u> </u>				LUCA 90'	1 1 1	
5-9	80-90		į	Y		1 1 1	
5-10	19-100		1		45'		
5- II	100-110			in saud Granel + cubble?	- von 110'	1 1	
5-12	119-120			(A-CS)	115'		
	120 - 130	1		med-crs sand (SP)			
5-13	120-12		ł		}	1 1	
5-14	130-140					1	
5-15	140-150						ļ
5-16	150-160		1		1 .		
	160-170		1	Fire - mod SAND (67)	160		
5-17		i			170'		
5-18	170-180			Med-crs SAND w/some gravel + cabbles mited in			
5-19	180-19	1			195	4	İ
5-20	190-20	4		Mod - Crs Sand (SP)	1.		l
5-21	200-210		1 .	Some thin gravel boyers			1
	2/0-220	1	[1	1 35 .	11	
5-22	213- 273	Ί.		1	- BOE 250,		1
					046 220		

FII	ELD	BORING	LOG		Во	ring No.	5~W-91-02C
Project No (553-03	Project N	ame BAAP	SI F	.		Page	01
Contractor Lame E	NU.	Driver Art R		Date started	10/22	completed	19/22
Method Dul Jul	Casing Siz	1 0h	HNU 11.	7/10.2 #5	Protectio	n Level 6	
Ground EL	Soil Drille	d 160'	₹ bek	ow ground es'	Total Des	th 160'	
Logged by Culby	Check	ed by DRP	Da	ne 10/25/91			

Sample	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring HNU LEL
	0-10 10-20 20-30 30-40 40-50 50-60			sorganies cobbles, gravel to cors sand (SP-GP) Fine- of Sand poorly Sorted some than layers of gravel (SP)	la'	DARAIM 0%
620-18-VICS 30	130-140 140-160 130-140 140-150 150-160	·	-	Granel Cabbles + cos sind (SP-GP) Med-Cos Sand (SP)	- 160' BOE 160'	

FIELD	BORING	LOG	Boring No. 5WH-91-03
Project No 6853-03 Project	Name BAAP	RI/FS	Page _ 1 _ ot _ 1 _
Contractor Layne	Driller Act	R Date started	10/3 completed 10/8
Method Hammer Casing	ize 4" 0D	HNU 11.7/10.2 TIP#5	Protection Level D
Ground EL Soil Dri	lled 120'	4 below ground 55	Total Depth /20'
Logged by Colby Cher	ted by DR	Date 10/10/91	·

Sample No	Depth in . Feet	Blows per 6 inches	Pen Hec	Description	Comments on Advance of Boring	Monitori HNU L	ng LEL
5-1	0-10	•		Bown /TAN fine-cos		TARATA	200
5-2	10-20			SAND Porchy surhad			
5-3	20-30		•	of fine gravel			
5-4	30 - 40			(57)]]]]]].	$\downarrow \mid$
5-5	40-50					1	
5-6	50-60			Tan Md-Crs SAUD Poorly sorted			
5-7	60-70	-		•			
260	70- 80			Some thin layers of gravel.	卫~85		
760-16-JUNE	80-10			(3P)	:		
K K	90-100						
Ke Ke	100-110	•		and south + Cornell Suns	105		
	110-120				112-115		
		·		Tan Md-crs SAND	- BOE 120'		
				(SP)	•		
				\downarrow			
,			•	B.O.E. 120'			
·		•					
					·		

FIELD	BORING	LOG	Boring No. 5WN-
Project No 6853-03 Project	Name BAAP	RIFS	Page
Contractor Layne	Driller A. (R Date started	0-2-9/ completed 10-2-9/
Method Punt-Will Casing	Size 9" 01)	HNU 11.7/10.2 TIP#/4	Protection Level
Ground El. Soil Dr	riled 165'_	4 below ground 85	Total Depth 45 77 170'
Logged by Blake Che	cked by	Date	

Sample	Desth in Feet	Blows per 6 incres	Pen Rec	Description	Comments on Advance of Boring	Monitoring
20-2-275 6 7 8 9 10 11 12 13 14 15 16 17	20-10 10-20 20-33 30-40 40-53 50-40 10-130 100-130 130-140 140-153 150-140 160-170			Brown-Tan Fine thed-costavity souted Some thin layers of fine grower (SP) Tan Med-crs Sand Party Sorted Some thin layers of grower (SP-GP) Tan Med-crs SAND (SP)	I ~ 85'	JAR ATR 093

FIELD	BORING LOG	Boring No. 5-41-030
Project No 6855-03 Project I	Name BAAP RI/FS	Page _1 of/_
Contractor Layne	Driller A. Rodrignez Date started 10/1	1/91 completed 10/1/91
	28 9" 00 HNU 11.7/10.2 TIP#S Pro	
Ground El Soil Drill	ed 2/0' 4 below ground gs' Total	Depth ZIO'
Logged by Buty Cally Check	used by DRP Date 10/10/41	

Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description		nents on of Boring	Mon	itoring LEL
20-10 10-20 20-30 30-40 40-50 50-60 70-80 50-90 90-100 100-120	-16-	•	Ç.	Brown-Tom Fine-Med-crs Sand. Posely Surfed Some than layers of Fine gravel (SP) Tan Med-crs Sand Posely surfed Some than layers of grant (SP) Some than layers of grant (SP) Fan Med-crs Sand	፟፟፟፟፟፟	~ 85'	TAR A	19 0%
130-140 149-150 150-163 160-170 170-180 180-190 140-203 200-210	5-20 5-14	• • • • • • • • • • • • • • • • • • •	·	(SP) Cos Sand, gravel + cobbles (5P-GP) Tam cos Sand (SP) Dolomite Bodrock 209'	- Boe	209		

FIELD BORING	LOG	Boring No. SWN-91
Project No6853-03 Project Name BAAP	RI/FS	Page of
COMPACTOR LAYNE ENV. OTHER A. R.	CORTGUEZ Date started	11/8/91 completed 11/10/91
Metrod Juci-Wall Rot, Casing Size 9"	HNU 11.7/10.2	Protection Level D
Ground EL Soil Drilled 2/0"	₹ below ground	Total Depth 258'
Logged by R. Pendelan Checked by CICK	>_ Date //-11-91	

Sample	Depth in	Blows per	Pen Rec	Description	Comm	ent	s on Borno	Мо	_	
No	Feet	6 Inches	Rec		-CVAINCE	<u> </u>	אינו יטפ	JAR/		LEL
j	0-10			Brown med. sand, tr. silt					KC.	i
				and coarse sand, poorly gradeil (SP).						
	10-100	;		Tan med. sand, some				1 1	П	
	10 100			fine sind, coarse sand					П	
i			•	and fine gravel, occusional	무	~	85 FL		11	
· ·	÷			abble, pacely gradel (SP)					$\ \ $	
	100-110			Tan med - crs. sand and	Ì					
حو				fine gravel, some med- crs. gravel, a few cobbles poorly graded (SP-GP).						
7				ors. graves, a ten cobies	}				Н	
કું. કું				1						
Boring Log	110-170			Tan meel. sand, some						
γ2				fine and coarse sard,						
30			ļ	tr. fine gravel, peorly	1					l
0	ł			gradel (SP).					$\ $	
SWN-91-03D	170-180		Ì	Tan crs. sand and fine				1	\parallel	
٧-	,,,,			Lung Lores seres Series					$\ $	l
3				and crs. gravel, peorly graded (SP-GP).	}					}
, i	l			3.224 (31. 31).						
Sae	180-210			Tan med crs. sand, tr	,				$\ \ $	
•	1	l		fine - med. gravel, poorly graded (SP).	H			1		j
45.0	ļ				1				11	[
F. 25.	210-220			Blue-Gray Dolomite Bedrock					$\ \ $	
34				1	,			\cdot	\parallel	1
807	220-235	}		Tan-Brewn Sandstone				Ì		1
K (6) Samples of block cuttings	235-258		1	Blue-Gray Dolomite	1					
325				B.O. E. 258 feet						
			1	B.C. E. ASD 1000	<u> </u>				4	

FIELD	BORING	LOG	Boring No. SNN-91
Project No 6853-63 Proje	et Name BAAP R	1/F5	Page of
Contractor Layne Env.	Orster A. Rol	VINUEZ Date star	red 10/26/9] completed 1/7/9
Method Triple Wall Cash		HNU 11.7/10.2	Protection Level D
	Drilled 210'	I below ground	85' Total Depth 230'
Logged by Colbuy C	necked by DRP	Date 1 / 10 /	191

BORING ABANDONED

Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	'Description	Comments on Advance of Boring	Monitoring HNU LEL
	0-10			Organic matter, gravel and coarse sand. (SP-GP)		JARAIN 09
	10-210			Tan, fine-coarse sand, somethin gravel layers (SP)	·	
407	210-220		~	Blue-gray delomite. BEDROCK		
See SWN-91-03D Boring Log	220-230			Sand and gravel, outwork Possibly a fault or freetor filled by outwash. (SP-GP) B.O. E. 230 feet BORING ABANDONED ON 11/07/91		

FII	ELD	BORING	LOG		Boring No. SWY-91-040
Project No 1853	Project N	me BAAP	RI/FS	·	Page ot
Contractor Layne		Driver Act	R	Date started	14/13 completed 10/13
Method Warner	Casing Suz	• 9" 00	HNU TI	.7/10.2	Protection Level ()
Ground El.	Soil Orthe	0 170'	₹ bei	ow pround 85	Total Depth 170'
Logged by Calby	Checks	DRP VO DR	Di	re (0/14/4)	
.,7					

Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring
(140-11-4c) ass	0-10 10-20 20-30 30-40 40-50 53-60 60-70 70-80 80-100 100-110 110-120 20-130 30-140 40-150 50-110 110-170			Fan Med-Crs Sand W/ thin layers of gravel (SP) Tom Mod-Crs Simd (SP) B.O.E. 170'	-	JAR AIR G

FI	ELD	BORING	LOG		Во	ring No	1 - SWN- 91-04
Project No (\$53-03	Project N	ame BAAP	RI/F			Page	of
Contractor Layne		Driller Act	R	Date started	10/9	completed	10/9
Mestod Hammer	Casing Su	te 9" 00	HNU T	7/102 TP#5	Protectio	n Level D	
Ground EL	Soil Drike	8 200'	₽ be	ow ground 85°	Total Des	th 200'	
Logged by Buly Cally	Check	ed by DRP	۵	me 10/10/91			

5-2 10-20 5-3 20-30 5-4 30-40 5-6 40-50 5-7 60-70 5-8 70-90 5-10 90-100 5-11 100-110 5-12 110-120 5-13 120-130 5-14 130-140 5-15 143-150 5-16 150-173 5-17 190-175 5-19 190-180 5-20 190-200 5-20 190-200 5-30 5-40 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200 5-10 190-200	5-2 10-20 5-3 20-30 5-4 30-40 5-5 40-50 5-6 50-50 5-6 50-70 5-7 60-70 5-10 90-100 5-11 100-110 5-12 110-120 5-13 120-130 5-14 139-140 5-15 140-150 5-16 150-160 5-17 150-170 7-19 190-140 6-10 190-200	Sample No	Depth in Feet	Biows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitor	ing LEL
~ 210'	Dulomike Bodrock	5-1 5-2 5-3 5-5 5-6 7 5-1 10 11 12 13 14 15 16 17 19	0-10 10-20 20-30 30-40 40-50 60-70 70-90 80-90 100-110 110-120 120-130 139-140 140-150 150-160 150-160 160-170 170-170 170-170		A-B-C	Tan Md. crs SAND Some thin layouts of grown! (SP) Tan Md-Crs Sand Some thin layouts of growe! (SP) Cos Sand, growe! + cubbles (SP-GP) Tan Crs Sand (SP) Delomike Bodrock	7 ~ 25' 18' 115'	JAR AIR	

FIE	ELD B	ORING	LOG		Bor	ing	NO.5NN-91-058
Project NO (153 - 03	Project Nam	* BAAP	RI/FS			Page_	
Contractor Layne E	neiron 0	miler Act	R	Date started t	0/12/11	comple	ted 10/12/41
Method House of	Casing Size	1" 00		7/10.2 TIP#5			
Ground El	Soil Drilled	120'	₹ belo	w ground	Total Depti	120	
Logged by Cuby-Give	of Checked	DRP DRP	Da	· 10/14/91			

Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	Com	ment	s on Boring	M H		rng LEL
	0-10			Ten Fine-Med Sand				JAR O		
	20 - 30			w/ Than layers of					1	
	30- 40			gravel				1	J	T
	46-50			(42)						
	50-60									
050	60 - 70									
, 16	70 - 90			V	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	- 5:	ر ا			
5WV- 91-05D	४० - ५०					- 0:	•			
<i>y</i>	90-100			·	98'					
Sec	100-110			Gowel, cas simul + Cabbles (SP-GP)	ĺ					
	110-120			Med-cos sand (5P)	115		,			
				1	Bos	: /7				
					,			-		
:										
!										

FIELD	BORING	LOG		Boring No. SW-91-66
Project No 1953-03 Project I	varne BAAP	RI/FS		Page of
Contractor Layne	Driver Act	R Da	te started	10/11/91 completed 10/12/91
Method Hamman Casing S	28 7 00	HNU 11.7/1	az TIP+5	Protection Level 0
Graund EL Soil Dmi			ground 85'	Total Depth 170
Logged by Buty Cully Ched	ved by DRP	Date	10/13A1	
. /				

Sample	Depth in	Blows per	Pen	Description	Comments on	Monitoring
No	Feet	6 inches	Rec		Advance of Boring	HNU LEL
Sec sulv-11-05D	20-30 30-40 40-50 50-60 60-70 70-80 80-90 100-110 110-120 120-130 130-140 144-150 150-110 160-170			Fine-Med SAND W/ Some thin layers S gome! (SP) Hed-crs Shind (SP) Growel, cobblest tos sond (SP) Med-crs Sand Med-crs Sand (SP)	√ ~ 85°	JAR ATR O'S

FIEL	D BORING	LOG	Boring No. Swe- 11+0
Project NO 6853-03 PM	DIECT Name BAAP	RI/Fs	Page 01
Contractor Layer	Orner Act R	Date started	10/10 completed 10/10
Method Hamme Ca	sing Size 9" 00	HNU 11.7/10.2 TIP#5	Protection Level
Ground EL So	N Drilled スoス'	\$ below ground 85'	Total Depth 202'
Logged by Binhy Cully	Checked by DRP	Date 10/11/91	

.

Sample No	Degth in Feet	Blows per 6 inches	Pen Rec	Description	Comments on Advance of Boring	Monitoring HNU LEL
5-1	0-10			Tan Fine-Med SAND		TARAIR 0%
5-2	10-20			some thin growel		00
5-3	20-33			layers (SD)		
5-4	3-2-40					
5-5	40-50					11 11 1
5-6	50-60					
5-7	60-70					
5-2	70-90					
5-9	80-40				15° ~ 25°	
5-10	90-100				15' Suples	
5-11	100-110			Gomel Colles + Cos Sund (SP-GP)	100'	
5-12	110-120			Med-cos SAND	115 110	
5-13	120-130			(SP)		
5-14	BO- 140					
5-15	142-153			Growel + cutilotes w/cis	·50'	
5-16	150-180			SAND (SP-GP)	(w)	
5-17	120-170			cos SAUD graval To		
5-13	172-150					
5-19	170-130			grown, cos send +	195'	
5-20	190-200			grand, cos soud + cobbles si-si		
<u> </u>					30E 202'	



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N484,732.21 E2,064,450.61

Boring No. S1101
Surface Elevation 823, 24
Job No. C 8742
Sheet 1 2

. 1409 EMIL STREET + P.O. BOX 9536, MADISON, WIS. 53715 + TEL. (606) 257-4846_

	•	A	MPL	Æ		CLASSIFICATION		SOIL	PRO	OPER	RTIES	- 3 \
	Type		1	Moisti	Depth	and Remarks	*	%Grave	% Sand	% P200	LL	
D0001			М	49		Tan to Brown Stratified Fine, to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP) Granite, Quartzite & Rhyolite Cuttings pfl at 20'	BBCC CCC C CB	44	48	8		
						* Topsnil, Brown to Black Clayey SILT, Trace Fine to Medium Sand (CL,CL-ML)	იიიიიიიიიიიიიიიიიი					



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N484,732.21 E2,064,450.61

Boring No. \$1101

Surface Elevation 828.24

Job No. C 8742

Sheet 2 of 2

,1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4648...

	S	AA	ЛPL	E		CLASSIFICATION		SOIL	PRO	PEF	TIES	
	Type		1	Aoisti N	Depth	and Remarks	*	% Grave	% Sand	% P200	LL	Pi
D0002			M	53	1 1 1 50	Tan to Brown Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)	00000	23	70	7		
						Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)					•	
00003	255	x	W	46		End Boring at 80'		1 GEN	94 NER#	5 AL NO	OTES	6
					90-		Dri	lling M	12/79 of RS/ othod ry Mu		12/1 CME	3/79 750

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N484.687.77 E2,067.591.00

Boring No. S1103
Surface Elevation 807.23
Job No. C 8742
Sheet 1 of 3

1409 EMIL STREET + P.O. BOX 9538, MADISON, WIS. 53715 + TEL. (608) 257-4848

	s		/PL	E	•	CLASSIFICATION		SOIL	PRO	PEF	RTIES	<u>-</u> \
	overy		,	Moist	Depth	and Remarks	*	%Grave	% Sand	% P200	LL	
						Topsoil, Brown to Black Clayey Sili, Trace Fine to Medium Sand (L.CL-ML) Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand (CL.CL-ML)						
D0004	SS	X .	M	22	-	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)	В	4	90	6	•	
00005	ss	x	М	65		Brown Fine to Coarse GRAVEL and to Some Fine to Coarse Sand, Little Silt and Clay, Occasional Cobbles and Boulders (GP-GM)		52	43	5		
						Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)						
						(Continued)						

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N484,687.77 E2,067,591.00

Boring No. \$1103 Surface Elevation \$07.53 Job No. \$742 Sheet 2 of 3

__1408 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848---

	5	A	ИPL	E		CLASSIFICATION		SOIL	PRC	PEF	RTIES	5
	Type		1	Aoist	Depth:	and Remarks	*	% Grave	% Sand	% P200	LL	P!
D0006		X	M		111111111111111111111111111111111111111	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)		0	94	4		
D0007	SS	X	М	43							-	
D0008	SS	X	M	71			8					



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N484.687.77 E2.067.591.00

Boring No. \$1103 Surface Elevation 807.63 Job No. C 8742 Sheet 3 of 3

. 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

	S	SΑλ	/PL	Ε		CLASSIFICATION		SOIL	PRO	PEF	RTIES	5
	covery	1 I	1	Aoistu	····	and Remarks	*	%Grave	% Sand	% P200	LL	PI
No.	SS		W		Depth 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5			3%	95	4		
D0010	SS	X	W	33						AL NO		
				-	- 135		Sta Cri Dn	ew Chi Bing M Rota	ef HF ethod ry Mi	Comple S	ete !!!	/2// E#1



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
N484.793.05 E2,771,101.83

Boring No. \$1106 Surface Elevation 837.24 Job No. C 8742 Sheet 1 of 3

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	S	AN	ЛРL	Æ		CLASSIFICATION		SOIL	. PRC	PEF	TIES	5
	Type		1	Moist	Jre Depth	and Remarks	*	%Grave	% Sand	% P200	ΓL	P!
D0011			M	13		Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand (CL,CL-ML)	0 0,7 0 0	6	6	6	•	
D0012	SS	X	M	18 	E	pfl at 45'	•	14	81	5		



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N484.793.05 E2,071,101.83

Boring No. S1106 Surface Elevation 837. Job No. C 8742 Sheet 2 of 3.

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	5	SAI	MPL	E		CLASSIFICATION		SOIL	PRO	PEF	RTIES	5
	covery		1	Moist	· · · · · · · · · · · · · · · · · · ·	and Remarks	*	%Grave	% Sand	% P200	ш	
No.	Туре	1	<u> </u>	N	Depth	Tan to Brown Stratified Fine to Coarse	 	38	8	8		
		İ			E	SAND, And to Some Fine to Coarse Gravel,				ļ		
					E	Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)						
00013	55	X	l _M	55	- - - -	, , , , , , , , , , , , , , , , , , ,		23	72	5		
55515		^	''		E			23	12]		
					E							
						pfl at 55'	C					
				ĺ	E							
					Ē:	_						
				1	F-60-							_
					E		c					
					E							
					E-65-	pfl at 65'					_	
					FI		C					
				ļ	E							
					E70H	pfl at 70'						
					F	-						
					E		С					
			l		-75 -75	pfl at 75'						
					El							
					FI							
					E-80-	•	-					
					Εl		c					
				l	<u> </u>	, `						
					85-							
			ļ		Εl]					
					E	•	c					
00014	ss	X	W	49	90	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt &		9	97	3		
]	Clay (SP,SP-SM)						_
						(Continued)						_ /



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N484.793.05 E2,071,101.83

Boring No. S1106
Surface Elevation 837.94
Job No. C 8742
Sheet 3 of 3

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4846-

SAMPL	-E	CLASSIFICATION			. PRC	PEF	TIES	3
Recovery No. Type	Moisture N Depth	and Remarks	*	%Grave	% Sand	% P200	LL	PI
00015 SS X W		pfl at 120' pfl at 130'	C C	GEN J1/1:	96 HFS,	AL NO	te11/	14/7 CE#1



Project Badger Army Ammunition Plant
Baraboo, Wisconsin

LocationN484.860_18...E2_072.645_25......

Surface Elevation
Job No. ..G. 8742...
Sheet 1 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848-

Recovery No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Ty		S	A٨	1PL	E	CLASSIFICATION	;	SOIL	_PRC	DPE	RTIE
Topsoil, Brown to Black Clayey SILT, Trace Fine to Medium Sand (CL,CL-ML) Tan to Brown Fine to Coarse SAND, Little to Some Gravel, Occasional Cobbles and Boulders (SM) C Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt			+	i.		 and Remarks	*	Grave	6 Sand	, P200	LL
D0016 SS X M 41 = -25 = and Clay (SP,SP-SM) -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25 = -25					41	Topsoil, Brown to Black Clayey SILT, Trace Fine to Medium Sand (CL,CL-ML) Tan to Brown Fine to Coarse SAND, Little to Some Silt and Clay, Little to Some Gravel, Occasional Cobbles and Boulders (SM) Fine to Medium SAND, Trace to Little Fine	င		*		

WARZYN

ENGINEERING INC

LOG OF TEST BORING

Project Badger Army Ammunition Plant Baraboo, Wisconsin
Location N484.860.18 E2,072.645.25

Boring No. S1107 Surface Elevation 810.06 Job No. C 8742 Sheet 2 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4648-

	S	AA	ЛPL	E		CLASSIFICATION		SOIL	. PRC	OPER	TIES	5
	Type		1	Moisti	Depth	and Remarks	*	% Grave	% Sand	% P200	LL	P!
D001 <i>7</i>	SS	x	W	71		Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) Tan to Brown Fine to Coarse SAND, Little to Some Silt & Clay, Little to Some Gravel, Occasional Cobbles and Boulders (SM)		0	96	4		
D0018	SS	X	₩	88		Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) End Boring at 78'	Cre Dri	irt]/]! w Chi	96 0/80 of HF	Comple S F	nel/1 NGACE	Q/80 #2

WARZYN

ENGINEERING INC

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N484,751.72 E2,073,316.38

Boring No.	S1108	
Surface El		
Job No	8/42	
Sheet	of	

. 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

-	S	λAί	/PL	E	•	CLASSIFICATION	,	SOIL	. PRC	PEF	ITIES	3
	Type		1	Moisti	ure Depth	and Remarks	*	%Grave	% Sand	% P200	LL	P
0019	SS		₩			Fill Material, Brown Silty CLAY, Some Sand and Gravel Topsoil, Brown to Black Clayey SILT, Trace Fine to Medium SAND (CL.CL-ML) Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)						
020	SS	x	W	22	-35- -1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	End Boring at 42'	Sta Cre Dri	GEN art 12/ ew Chi ding M	97 NERA 29/80 et J ethod y	Comple IR F	ard AC	



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N488,536.15 E2,064,509.76

Boring No. S1109
Surface Elevation 854.68
Job No. C 8742
Sheet 1 of 3

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·	SAI	MP	LE		CLASSIFICATION		SOIL	PRO	PEF	RTIES	3
Recover	<u> </u>	1 1	Moist	Depth	and Remarks	*	% Grave	% Sand	% P200	LL	P
00021 SS	x	М	NA		Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand (CL,CL-ML)		0	18	72		
				13	Tan to Brown Stratified, Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)	C C				•	
0022 SS	X	M	49	-	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)		0	94	6	•	



Project Badger Army Ammunition Plant
Baraboo, Wisconsin

Location N488,536.15 E2,064,509.76

Surface Elevation
Job No. C 8742
Sheet 2 of 3

1409 EMIL STREET + P.O. BOX 9538, MADISON, WIS. 53715 + TEL. (608) 257-4648-

	5	SA	M	PL	E		CLASSIFICATION		SOIL	PRC	PEF	TIES	3
	Type	. 1	,	₩ 	loistu N	Depth	and Remarks	*	% Grave	% Sand	% P200	LL	1
						–	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)						
						<u>.</u>	Tan to Brown Stratified, Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)	C C					
						70- 1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)						
0023	\$\$	X		W	48	8	Tan to Brown Stratified, Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)	00 0	5	92	3		
					-	85- 1- 1- 1- 1- 90-	(Continued)	С					



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N488,536.15 E2,064,509.76

Boring No. S1109
Surface Elevation 854.68
Job No. C 8742
Sheet 3 of 3

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	5	SAN	1PL	E		CLASSIFICATION		SOIL	. PRC	PEF	RTIES	
	Type	1 1	+	Agisti	Depth	and Remarks	*	%Grave	% Sand	% P200	LL	PI
D0024	SS	RR	•	100		End Boring at 108'	Sta Cre Dni	GEN r. 2/1 nw Ching M	JERA 4/80 JES	L NC	DTES	/8



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N486,476.12 E2,073,302.11

Boring No.	\$1110
Surface El	evation .8
Job No. ^C	8742
5heet	of2

,1408 EMIL STREET • P.G. BOX 9536, MADISON, WIS. 53715 • TEL. (608) 257-4846.

	S	AN	APL	E	· · · · · · · · · · · · · · · · · · ·	CLASSIFICATION		SOIL	PRC	PEF	RTIES	3
	Type			Moist	ure Depth	and Remarks	*	% Grave	% Sand	% P200	LL	
						Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand (CL,CL-ML)	В С	*	*	_ &		
							C C B					
0025	SS	X	M	30	1111115 25-	to Some Silt and Clay, Little to Some Gravel, Occasional Cobbles and Boulders (SM		12	82	6	•	
						Tan to Brown Stratified, Fine to Coarse SAND, And to Some Fine to Coarse Gravel Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)						
					-45 -	(Continued)						



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N485,475.12 E2,073.302.11

Boring No. S1110
Surface Elevation 810.48
Job No. C 8742
Sheet 2 of 2

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	5	AA	JPL	E		CLASSIFICATION		SOIL	L PROPERTIES				
	overy Type			Aoistu N	Depth	and Remarks	*	% Grave	% Sand	% P200	ŁL	PI	
D0026	SS	X	W	30	កាក្នុកក្រក្រក ទិ	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and		10	85	5			
00027	SS	X	М			to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)				7 AL NO			
					- -90-		Dril	ling M	ethod .	Comple S F		••••	



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N487,413.09 E2,075,847.11

Boring No	<u> </u>	
Surface Election NoC	vation 8742	
Sheet		3

1409 EMIL STREET + P.O. BOX 9538, MADISON, WIS. 53715 + TEL. (608) 257-4848.

SAMPLE				,	CLASSIFICATION		SOIL	RTIES			
Recovery No. Type	1	+	Aoistu	Depth	and Remarks	*	%Grave	% Sand	% P200	LL	F
00028 SS 00029 SS	XX	M			Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand (CL,CL-ML) Tan to Brown Fine to Coarse SAND, Little to Some Silt and Clay, Little to Some Gravel, Occasional Cobbles and Boulders (SM) Tan to Brown Clayey Silty SAND, Little to Some Gravel (SC)	CO C	8 10	79 45	13 45	25.9	9.
1 1	- 1	- 1		1	(Continued)	1	l	ł	1	1	1



WARZYN | LOG OF TEST BORING

Project	Badger Army A	mmunition Plant
	Baraboo, W	isconsin
Location		E2,075,847.11

Boring No	\$1111	
Boring No Surface E		
Job No	C 8742	· • • • • • • • • • • • • • • • • • • •
Sheet	? of	3

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SAMPLE				E.		CLASSIFICATION		SOIL PROPE				
	Type		↓ A	Moisti N	Depth	and Remarks	*	%Grave	% Sand	% P200	LL	P
					الماليليليل الخاطيليليليليليليليلي	Tan to Brown Clayey Silty SAND, Little to Some Gravel (SC)						
						Fine to Medium SAND, Trace to Little Fine						
0030	SS	X	М	50		·		7	92	7	•	
					75- -75- 		•					
			•	_	85- 1-85- 1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1							



WARZYN | LOG OF TEST BORING

Project	Badger /	Army	Ammunition	Plant
			Wisconsin	
			E2,075,84	

Boring No.	\$1111
Surface Ele	
Job No	8742
Sheet3	of3

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SAMPLE CLASSIFICATION	SOIL PROPERTIES					5
Recovery Moisture and Remarks No. Type N Depth	*	% Grave	% Sand	% P200	LL	r.
	Stan	GEN	96	4 NO	OTE:	



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N490,049.07 E2,076,746.15

Boring No. S1112
Surface Elevation 836.23
Job No. C 8742
Sheet 1 of 3

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Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N490,049.07 E2,076,746.15

Surface Elevation 8
Job No. C 8742
Sneet 2 of 3

1409 EMIL STREET • P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (606) 257-4848...

	SAI	MP	LE		CLASSIFICATION		SOIL	PRO	OPEF	TIE	S
Recover	- J	T,	Moist	-	and Remarks	% Sand % Sand 17				T	
No. Typ	*		N	Depth			- 5°	8 8	× ×	II	1.
0033 SS		M			Tan to Brown Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)	CC C	17	70	13		



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N490,049.07 E2,076,746.15

Boring No. \$1112 Surface Elevation 836.23 Job No. C 8742 Sheet ... 3 ... of ... 3

, 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

SAMPI	Æ	CLASSIFICATION		SOIL	. PRC	PEF	RTIES	
<u> </u>	Moisture	and Remarks		%Grave	% Sand	% P200	LL	PI
No. Type 7	N Depth	*	*	%	*	*		
D0034 SS X W		Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clav (SP.SP-SM) End Boring at 96'		0	97	3		-
	֡֜֜֝֜֝֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓	* Tan to Brown Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)	Sta Cre	nt 1/3 w Chi	JERA /80 c	Comple SF	to 1/.1	/80 #2



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N491,603.29 E2,079,574.42

_ 1409 Emil Street • P.O. Box 9538, madison, WIS. 53715 • Tel. (608) 257-4848_

SAMPL	E	CLASSIFICATION		SOIL	s			
Recovery I	Moisture N Depth	and Remarks	*	%Grave	% Sand	% P200	LL	P!
D0035 SS X M	ակակականականականականականականականականակա		88 C C B B C	19	73	8		
		(Continued)						۱ ـ



Project Badger Army Amnunition Plant
Baraboo, Wisconsin
Location N491,603.29 E2.079.574.42

,1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848--

Recovery No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Type No. Typ	SAM	MPLE ·	CLASSIFICATION		SOIL	.PRC	OPEF	RTIES	3
Tan to Brown, Stratified Fine to Coarse SAND, and to Some Fine to Coarse Gravel, Trace to Little Silt and Clay Sociational Cobbles and Boulders (SP-SM,SW-SM) (SP) The strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strategy of the strate				*	%Grave	% Sand	% P200	LL	Р
pfl at 83' 85 Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)	0036 SS X		SAND, and to Some Fine to Coarse Gravel, Trace to Little Silt and Clay Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP) pfl at 67' ofl at 83' Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and	CCCC	47	49	4		



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N491,603.29 E2.079,574.42

Boring No. S1114
Surface Elevation
Job No. C 8742
Sheet 3 of 3

. 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

SAMPLE				Æ		CLASSIFICATION	SOIL PROPERTI					5
	Type	1	1	Moist	Depth	and Remarks	*	% Grave	% Sand	% P200	LL	PI
D0037	SS	X				Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) pfr at 103' to 105' End Boring at 106'	Star Cre Drill Ro	rt]]/ w Chir ling Mi tary	JERA 19/79 or HF	Comple S P	ne ACE	#1 {



Project Badger Army Ammunition Plant-Baraboo, Wisconsin

Location N490,445.70 E2.070,359.29

Boring No. S1116
Surface Elevation 860.41
Job No. C 8742
Sheet 1 of 4

	s	A۱	ЛPI	E		CLASSIFICATION		SOIL	. PRC	PEF	RTIES	5
Recov No. Ty	/ery /pe	- 1	1	Moist	Depth	and Remarks	*	%Grave	% Sand	% P200	LL	Pi
	/Pe	- 1	1.	N	Depth	Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand (CL,CL-ML)	* c c c c c	% Gravi	% San	% P2α	-	PI
						Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) (Continued)			•			

WARZYN ENGINEERING INC

WARZYN | LOG OF TEST BORING

Project	Badger	Army	Ammunition	Plant
			Wisconsin	
Location			E2,070,3	

Boring N	lo	\$1116	
Surface	Elev	ation .	_
Job No.	ل	8742	
Shoot	2	of	4

"1408 EMIL, STREET • P.Q. BOX 9538, MADISON, WIS. 53715 • TEL. (508) 257-4848...

Recovery Moisture and Remarks	5	SAI	MF		E		CLASSIFICATION	SOIL PROPER				RTIE	S
Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and CLAY (SP,SP-SM) 50 C C C C C C C C C C C C C C C C C C C	 , 	1		1			and Remarks	*	%Grave	% Sand	% P200	LL	
SAND, And to Some Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP) Coarse Gravel, Trace to Little Fine to Coarse Gravel, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Cobbles and Clay (SP,SP-SM)						F-	to Coarse Gravel, Trace to Little Silt and						
Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)					•	. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional	CBC CBC					
Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)					:	ابايايا	Continual Fluid Losses between 50' and 85'	C B					
						85-	to Coarse Gravel, Trace to Little Silt and [•					



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N490,445,70 E2,070,359.29

Boring No. \$1116
Surface Elevation 860.41
Job No. C 8742
Sheet 3 of 4

. 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TRL. (608) 257-4848.

	SAMPLE				<u> </u>	CLASSIFICATION	SOIL PROPERTIES							
	Type	÷ 1		Moistu	Depth	and Remarks	*	%Grave	% Sand	% P200	LL	P		
0039	SS	X	W	66	95	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)		5	91	4				
						- Tan to Brown, Stratified Fine to Coarse	С							
					E !	SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)	C							
0040	SS	X	W	118	+15-1 - - - - - - - - - -	tfl at 115' to 116'	C	40	54	6				
				-	125	Sandstone Cuttings 120' to 125' . Fine to Medium SAND, Trace to Little Fine	00000 0							
				[_ 1	to Coarse Gravel, Trace to Little Fine (Clay (SP,SP-SM)								
		-				(Continued)								



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N490,445.70 E2,070,359.29

Boring No. S111
Surface Elevation 860
Job No. C 8742
Sheet 4 of 4

.1409 EMIL STREET • P.O. BOX 9838, MADISON, WIS. 53715 • TEL. (608) 257-4846.

	SAMPLE					CL ASSISION I		SOIL	PRO)PEF	ITIES	5
J	Type	- 1	1	Moist		CLASSIFICATION and Remarks	*	% Grave	% Sand	% P200	u	PI
D0041		X	W		المراسليل	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)		*	***	*		
D0041	SS	X	W			End Boring at 141'						
					175 1- 1- 1- 1- 1-80		Sta Cre	uri 2/ ew Chi lling M	NERA 11/79 lef HF lethod .	Comple SR	2/. AC	E #1



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N490,354.23 E2,066,372.44

Boring No. ...\$1117.

Surface Elevation 862.51

Job No. C 8742

Sheet 1 of 3

1409 EMIL STREET + P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4648

	S	AN	ΛPL	E		CLASSIFICATION		SOII	_ PRO	OPE	RTIE	5
	Type	1 1	1	Moist	Depth	and Remarks	*	% Grave	% Sand	% P200	LL	Pi
					1	Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand (CL,CL-ML)						
					ى <u>ل</u> ىلىلىلىل ق		C					
						Tan to Brown, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel,	C					ļ
					5 1.1.1.1	Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)						
					- - 20-		С				•	
D0042	~~	X	M	40	- - - - - - - - -		0000	20	76	4		
D0045	SS	X	M			Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)	-					
				••	<u>-</u> 45-	(Continued)						ا ر



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N490,354.23 E2,066,372.44

Boring No. S1117
Surface Elevation ...
Job No. C 8742
Sheet ...2 of ...3

1409 EMIL STREET + P.O. BOX 9536, MADISON, WIS. 53715 + TEL. (608) 257-4848-

	S	ΑN	NPL	E		CLASSIFICATION SOIL PROPERT		RTIES	5			
Reco	very	+	1	Moist	Depth	and Remarks	*	%Grave	% Sand	% P200	LL	Fi
D0043	SS	X	M	54	ក្រុកក្រុកក្រុកក្រុកក្រុកក្រុកក្រុកក្រុ	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) Tan to Brown, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)	, , , , , , , , , , , , , , , , , , ,	40	54	6		



WARZYN | LOG OF TEST BORING

Project	Badger	· Arr	пу	Ammunition	Plant
	Ba	rabo	00.	Wisconsin	
				F2.066 372	

Boring N	lo	\$111	7
Surface			
Job No.	C	8742	.
Sheet	3	of	3

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

Mousture Mousture And Flammarks Recovery Mousture And Flammarks Recovery Mousture And Flammarks Recovery Recovery And Flammarks Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery Recovery	Mosture And Remarks ** ** ** ** ** ** ** ** ** ** ** ** **		SAMPLE			.E		CLASSIFICATION	SOIL PROPERTIE					
Tan to Brown, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Frace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SM-SM) (SP) Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) Tan to Brown, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SM-SM) (SP) Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Fine to Coarse Gravel, Trace to Little Fine to Coarse Gravel, Trace to Little Fine to Coarse Gravel, Trace to Little Fine to Coarse Gravel, Trace to Little Fine to Coarse Gravel, Trace to Little Fine to Coarse Gravel, Trace to Little Fine to Coarse Gravel, Trace to Little Fine to Coarse Gravel, Trace to Little Fine to Coarse Gravel, Trace to Little Fine to Coarse Gravel, Trace to Little Fine to Coarse Gravel, Trace to Little Fine	Tan to Brown, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, SAND, And to Some Fine to Coarse Gravel, Cobbles and Boulders (SP-SM,SW-SM) (SP) Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Tobarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) Tan to Brown, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM.SW-SM) (SP) The to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM.SW-SM) (SP) Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) End Boring at 121' End Boring at 121'				, '	_		and Remarks	*	% Grave	% Sand	% P200	LL	PI
Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) Tan to Brown, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM.SW-SM) (SP) Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) O044 SS X M 44	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) Tan to Brown, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM.SW-SM) (SP) The to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) Output End Boring at 121'						-1 95 -1 -1 -1 -1 -1	SAND, And to Some Fine to Coarse Gravel, Trace to LittLe Silt and Clay, Occasional	000					
Tan to Brown, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM.SW-SM) (SP) Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) O 98 2	Tan to Brown, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM.SW-SM) (SP) Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) SS X M 44 End Boring at 121' End Boring at 121'						الماماما	to Coarse Gravel, Trace to Little Silt						
0044 SS X M 44 120 to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)	to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) End Boring at 121' End Boring at 121'							SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional	00000				•	
		0044	ss	x	M	44	E	to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)		0	98	2		i



Project Badger Army Anmunition Plant
Baraboo, Wisconsin
Location N492,933.24 E2.072,320.48

Boring No	\$1118
Surface Elev	
Job NoC	8742
Sheet 1	of3

. 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

	5	AA	/PI	E		CLASSIFICATION		SOII	PRO	PEF	RTIES	3
	Type		+	Moist	Depth	and Remarks	*	%Grave	% Sand	% P200	ш	PI
D0046				19		Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand (CL,CL-ML) Cobbles and Boulders from 19' to 25' Tan to Brown Fine to Coarse SAND, Little to Some Silt and Clay, Little to Some Gravel. Occasional Cobbles and Boulders	BB B BBCB BC C C	11	73	16		
			į			(Continued)	}					ر



Project	Badger Army A	mmunition Plant
	Baraboo	, Wisconsin
Location		E2.072.320.48

Boring No. \$1118 Surface Elevation 872.84 Job No. C 8742 Sheet 2 of 3

. 1409 EMIL STREET + P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (608) 257-4848 ...

S	Aλ	/PL	E		CLASSIFICATION		SOIL	PRC	PEF	TIES	3
 Covery		+	Moist	Depth	and Remarks	*	% Grave	% Sand	% P200	LL	PI
					Tan to Brown Fine to Coarse SAND, Little to Some Silt and Clay, Little to Some Gravel, Occasional Cobbles and Boulders(SM)						
				.1.55- 1.1.1.1.	pfl at 54'	С					
				-1 60-	-	C B C					
				- - - - - - - - - - - - - - - - - - -	Quartzite Cuttings	В C В					
					Continual Total Fluid Loss Between 67' - 75'	8888CCB				•	
			•		Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)	С					
				85- - - - - - - - 90-		С					
	ĺ				(Continued)				ľ		



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N492,933.24 E2,072,320.48

Boring No. S1118
Surface Elevation
Job No. C 8742
Sheet 3 of 3

,1409 EMIL STREET • P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (608) 257-4848=

Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth Type V N Depth
SS X W 35 Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)
GENERAL NOTES Staht / 27/7.9. Complete Crow Creat. HFS. Rig. ACE.



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N496,201.38 E2,072,983.10

Boring No. S1119
Surface Elevation 877.67
Job No. C 8742
Sheet 1 of 3

. 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (606) 257-4848-

	S	SAN	JP	E		CLASSIFICATION		SOIL	PRO	OPER	RTIES	3
No.	Covery Type	1	1	Moist	Depth	and Remarks	*	% Grave	% Sand	% P 200	LL	PI
						Tan to Brown Fine to Coarse SAND, Little to Some Silt and Clay, Little to Some Gravel, Occasional Cobbles and Boulders (SM)	С					
D0049 (Divid	ed			21 in	11 120- 120- 125- 125- 125- 125- 125-	Occasional Layers of Sandy Silt		0	42	!	17.7	2.2
D0050	SS	X	•	-	- 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) Occasional Layers of Clayey Sand		0	94	6		
					-45-	Tan to Brown Fine to Coarse SAND, Little to Some Silt and Clay, Little to Some Gravel, Occasional Cobbles and Boulders (SM) (Continued)	С					



WARZYN | LOG OF TEST BORING

Project	Badger Arm	y Ammunition	Plant
		o. Wisconsin	
		38 E2,072,98	

Boring No	<u>.</u>	1119	
Surface Ele	vation	8	
Job No C	8742		
Sheet 2	of		3

,1409 Emil Street • P.Q. Box 9838, Madison, Wis. 53715 • Tel. (608) 257-4848=

S	iΑλ	/PL	E		CLASSIFICATION	!	SOIL	PRC	PEF	TIES	3 '
 Type	1	, '	Moist	ure Depth	and Remarks	*	% Grave	% Sand	% P200	ιι	1
	,		ļ	ក្រព្រព្រម្មព្រះព្រះព្រះព្រះព្រះព្រះព្រះព្រះព្រះព្រះ	•	<u> </u>					
				165 111111170		טטטט נ				•	
					Large Fluid Losses 73-93' Brown Fine to Coarse GRAVEL And to Some Fine to Coarse Sand, Little Silt and Clay, Occasional Cobbles and Boulders (GP-GM)	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
				<u>-</u> 90-	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) (Continued)	С					



Project	Badger Army Ammunition Plant	
	Baraboo, Wiscomsin	
Location	N496,201.38 E2,072,983.10	

Boring No.	\$1119
	\$1119 evation 877.67
JOD NO	8742
Sheet	of 3

_1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

	S	SAN	<u>. </u>			CLASSIFICATION				OPE	RTIES	
	Type		1	Moist	Depth	and Remarks	*	%Grave	% Sand	% P 200	LL	PI
					امليليا		CC					
					- 95 - 1 - 1 - 1		С					
					الظيابا	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and	С					•
D0051	SS	X	W	84	- 705-	Clay (SP,SP-SM)		13	84	3		
											•	
					1- 1-15-							
						•						
00052	SS	NR	-			End Boring at 121'						
					1 25							
					130 -			<u> </u>			1	
					135		Sta	n]/]	9/80	AL NO Comple HFS F	ne1/ 2	2/8C
					135					d		



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N493,313.14 E2,075,597.06

Boring No. S1J20
Surface Elevation 873-06
Job No. C 8742
Sheet 1 of

		SAI	MPI	LE		CLASSIFICATION		SOIL	_ PRO	OPE	RTIE	S
	Type	4 1	+	Moist		and Remarks	*	% Grave	% Sand	% P200	LL	P
					ا السَّال السال السال	Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand (CL,CL-ML)						
0053	SS	X	M			Quartzite Cuttings Tan to Brown Fine to Coarse SAND, Little to Some Silt and Clay, Little to Some Gravel, Occasional Cobbles and Boulders (SM)	CCCCCBCCCCCCCCBCCCB C C C	1	84	15		
]	- }	j				(Continued)		1	Í			



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N403,313.14 E2,075,597.06

Boring No. S1120 Surface Elevation 877.26 Job No. C 8742 Sheet 2 of 3

1409 EMIL STREET + P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (508) 257-4848-

SA	MP	LE		CLASSIFICATION		SOIL	- PR	OPEF	RTIES	3
Recovery No. Type	, ,	Moist		and Remarks		%Grave	% Sand	% P200	LL	P!
·				Tan to Brown Fine to Coarse SAND, Little to Some Silt and Clay, Little to Some Gravel, Occasional Cobbles and Boulders (SM)	C B C C					
			-55- -1	• _	С					
			60		CC					
			E. E.65.		C					
00054 SS X	M	85		Tan to Brown Stratified Fine to Coarse SAND, And to Some Fine to Caorse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)	CBCC	22	68	10	•	
			70-	•	СВ					
			80		CBCBC					
] . 	_	85- - - - - 90-		C CC					
				(Continued)						



Project Badger Army Ammunition Plant
Baraboo, Wisconsin

LocationN493,313_14...E2_075,597_06......

Surface Elevation Sheet 3 of 3

.1409 EMIL STREET • P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (608) 257-4848.

	SAI	MPI	LE		,	Γ	SOIL	_ PRO	 OPEF	PERTIES		
Recover	- i	1	Moist	ure Depth	CLASSIFICATION and Remarks	 	% Grave	Sand	P200	LL	F	
DOO55 SS			. 40	ਪਾਸਾ ਨੂੰ ਸੰਗਰ ਸੂਰਾ ਸੁਰਾਜ਼ ਸੁਰਾਜ਼ ਸੁਰਾਜ਼ ਸੁਰਾਜ਼ ਸੁਰਾਜ਼ ਸੁਰਾਜ਼ ਸੁਰਾਜ਼ ਸੁਰਾਜ਼ ਸੁਰਾਜ਼ ਸੁਰਾਜ਼ ਸੁਰਾਜ਼ ਸੁਰਾਜ਼ ਸੁਰਾਜ਼ ਸ	Tan to Brown Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP) End Boring at 125'		GEN ml/10 ming M	SERA 5/80 c of Hi	6 L NC	OTES	80 1	



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N496,296.77 E2,079,127.02

Boring No	\$1121
Surface Elevation	813.93
JOB No. C 8742	
Sheet of	2

.1409 EMIL STREET • P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (608) 257-4846...

		SAI	ΜP			CLASSIFICATION		SOI	PR	OPE	RTIE	s
	Type	1	+	Moist	ure Depth	and Remarks	*	% Grave	% Sand	% P200	LL	PI
	Туре	1				Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand (CL,CL-ML) Tan to Brown Fine to Coarse SAND, Little to Some Silt and Clay, Little to Some		14 Yeray	79	7 P20	·	PI
						Brown Silty Clay 41'42' (Continued)	C					



Project Badger Army Ammunition Plant
Baraboo, Wisconsin

Location 11496,296.77 E2,079,127.02

Boring No. S1121
Surface Elevation 8
Job No. C 8742
Sheet 2 of 2

... 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

	S	AN	1PL	E	;	CLASSIFICATION	SOIL P			PROPERTIES			
	overy Type		ļ.	Acisti	Depth	and Remarks		% Grave	% Sand	% P200	LL	PI	
00057		X	W	21	الىلىلىلىل خ	Tan to Brown, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)		6	88	6			
					1 1 1 55- 1 55-	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)	С					-	
0058	SS	x	W	43		End Powing at 61		0	91	9			
					1-1-65- 1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	End Boring at 61'							
						·					-		
					F								
·					-75- - -	·-							
				•	80-								
					85- 85-				NER/			3	
				-	90-	·	Cre Dril	w Chi ling M	8/80 _c HFS, ethod. Mud	BLHF	ag Ala	•••••	



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N500,702.29 E2,074,444.43

Surface Elevation 904.87

Job No. C 8742

Sheet 1 of 4

Boring No. \$1122

,1409 EMIL STREET • P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (608) 257-4848...

	5	AN	/PL	E		CLASSIFICATION and Remarks		SOIL	PRC	PEF	RTIES		
ļ ———	covery		1	Aoisti				%Grave	% Sand	P200	LL	PI	
No.	Туре	*	*	N	Depth			3	*	8		i	
					- - - - - - - - - - - - - - - - - - -	Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand (CL,CL-ML)							
						•	CCCCCC						
					20-	Tan to Brown, Stratified Fine to Coarse SAND. And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)	CCC				•		
D0059	SS	NR	-	-			c						
D0060	SS	X	М		[.] 5- [.] 1-[.] 1-[.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.] 5- [.]		С	11	79	10			
						(Continued)						ا : نمص	



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N500,702,29 E2.074,444.43

Boring No. \$1122 Surface Elevation 9. Job No. \$742 Sheet 2 of 4

1409 EMIL STREET . P.O. BOX 9536, MADISON, WIS. 53715 . TEL. (608) 257-4848...

	SAMPLE Recovery Moisture			E		CLASSIFICATION		SOI	PRO	OPEF	RTIES	5 /	
No.	Type	- 1		→ M	loist. N	Depth	and Remarks		% Grave	% Sand	% P200	LL	F.
00061	SS	X	X		-		SAND. And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)	C C C C C C C C C C C C C C C C C C C	22	71	7		
				\perp			(Continued)						



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N500,702.29 E,2074,444,43

Boring No. S1122
Surface Elevation 904.87
Job No. C 8742
Sneet 3 of 4

1409 EMIL STREET . P.O. BOX 9538, MADISON, WIS. 53715 . TEL. (608) 257-4846...

	5	SAN	NPL	E	CLASSIFICATION		SOIL	PRO	OPEF	RTIES		
	coven	. 1	H	Moist	 and Remarks	*	%Grave	% Sand	% P200	LL	PI	
No.	SS	X	М	N	Tan to Brow, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP) Quartzite Cuttings at 120' Brown Clayey SILT, Little to Some Fine Grained Sand, Trace Gravel (ML)	ССВ	9%	3	97	•		
					(Continued)							



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N500,702.29 E2,074,444.43

Boring No	\$1122
Surface Elevation	
Job No. C 8742	
Sheet of	4

1408 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

	SA		IPL	E				SOIL	PRC	PEF	RTIES	- 1
Recover No. Type	<u> </u>	+	į A	Aoisti	Depth	CLASSIFICATION and Remarks	*	% Grave	% Sand	% P200	LL	!
	<u> </u>		,	N		Brown Clayey SILT, Little to Some Fine Grained Sand, Trace Gravel (ML) Tan to Brown, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP) End Boring at 144'	C B C B C C	GEN 1/24/	ERA /80 c	L NO	OTES	/8



Project	Badger Army Ammunition Plant	
	Baraboo, Wisconsin	
	N494,500.23 E2,062,374.27	

Boring No	\$112	3
Surface Ele	vation	867.03
Job No	, 0/42	
Sheet 1	of	3

,1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

	SA	MP	LE			CLASSIFICATION					RTIES	
Recover No. Type	- i	+	_	oistu: N	Depth	and Remarks	*	%Grave	% Sand	% P200	LL	PI
D0063 SS		M		54		Topsoil, Brown to Black Clayey SILT, Trace Fine to Medium Sand (CL,CL-ML) Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand with Some Cobbles (CL,CL-ML) pfl at 8-11' Tan to Brown, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel,	იიიიიიიი ი იი	10	75	75		
					1	(Continued)	۱	1		!	1	



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N494,500.23 E2,062,374.27

Boring No	S112	3
Surface Ele	evation	
Job No	8/42	
Sheet 2	of	3

.1408 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848-

SAM	·	CLASSIFICATION		SOI	_PRO	OPEF	RTIES	5 1
Recovery No. Type	Moisture N Do	and Remarks	*	% Grave	% Sand	% P200	LL	P:
		Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay with Occasional Thin Seams of Silty Sand (SP,SP-SM) Tan to Brown, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)	000 0 000000 0 0· 0	% Grave	pues % 49	7 NP 200		P
			C					
		(Continued)		j				,



ENGINEERING INC

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N494,500.23 E2,062,374.27

Surface Elevation 867.03

Job No. C 8742

Sheet 3 of 3

1409 EMIL STREET + P.O. BOX 9538, MADISON, WIS. 53715 + TEL. (608) 257-4848...

	5	λΑ	1Pl	E	•	CLASSISION TON	:	SOIL	PRC	PEF	TIES	;
	Type	1	,	Moist	ure Depth	CLASSIFICATION and Remarks	*	% Grave	% Sand	% P200	LL	P!
	1,700				<u> </u>	•		-	•	-		
D0065	255	x	М	60		to Coarse Gravel, Trace to Little Silt, and Clay (SP,SP-SM)	С	1	94	5		
		,			ម្រាម្រាក្រក្រក្រក្រក្រក្រក្រក្រក្រក្រក្រក្រក្រក	Tan to Brown, Stratified Fine to Coarse SAND And to Some Fine to Caorse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)		•			•	
						* Tan to Brown, Stratified Fine to Coarse SAND And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)						
00066	255	x	W	48	130- 130- 135-	·	Sta	r] 2/2 m Chi	IERA 0/80-	ompk	ta 2/3 ng 750	2.8/.8 0
					_, 55	End Boring at 135'	Onl	ing Mi Rotai	ethod. ry. Mu	<u>d</u>		



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N497,938.40 E2,072,925.10

Surface Elevation
Job No. C 8742
Sheet 1 of 3

_1409 EMIL STREET • P.O. BOX 9636, MADISON, WIS. 53715 • TEL. (608) 257-4646...

		AA	/PL	E		OLACOITO ATION		SOIL	PRC	PER	TIES	5
	Type		1	Aoist	Depth	CLASSIFICATION and Remarks	*	% Grave	% Sand	% P200	LL	
					ىلىلىلىلىلىلىلىلىلىلىلىل خ	Tand to Brown Fine to Coarse SAND, Little to Some Silt and Clay, Little to Some Gravel, Occasional Cobbles and Boulders (SM)	в в сс					
					ىلىلىلىلىلىلىلىلىلىلىلىلىلىلىلىلىلىلىل	Brown Fine to Coarse GRAVEL and to Some Fine to Coarse Sand, Little Silt and Clay, (GP-GM) pfl at 10-15'						
D0067				36	ادادادا	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)	•					
		^	rı	•		* Topsoil, Brown to Black Clayey SILT, Trace Fine to Medium Sand (CL,CL-ML)						
			į			(Continued)						



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N497,938.40 E2,072,925.10

,1409 EMIL STREET • P.O. BOX 9838, MADISON, WIS. 53715 • TEL. (608) 257-4848-

SAMPLE			CLASSIFICATION		SOIL PROPER			RTIE:	TIES		
 Type		, '	Maist	Depth	and Remarks		% Grave	% Sand	% P200	LL	Pi
255	X	M	•		Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) Brown Fine to Coarse GRAVEL and to Some Fine to Coarse Sand, Little Silt & Clay, Occasional Cobbles & Boulders (GP-GM) Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay with Occasional Thin Seams of Silty Sand (SP,SP-SM)		3	91	6		
					(Continued)					İ	



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N497,938.40 E2,072,925.10

Surface Elevation .8

Job No. C 8742

Sheet ... 3 ... of ... 3

1409 EMIL STREET • P.O. SOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4645-

		AA	ΛΡΙ	£		CLASSIFICATION		SOI	_ PR(OPE	RTIE:	s \
	overy		ļ	Moist	Depth	and Remarks		% Grave	% Sand	P200	LL	Ρ,
	y y pe	 	-	"	Pepul		╁	*	1 %	*	1	
D0070	255	x	W	1 од.		Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)		7	70	23		
						Tan to Brown Fine to Coarse SAND, Little to Some Silt and Clay, Little to Some Gravel, Occasional Cobbles and Boulders (SM)	00000000 0 0					
D0071	255	x	м			End Boring at 130'	C CC	34 GEN	53 VER /	13	OTE	
					- - - - - 135		On Dn	ert]2/ ew Chi ding M	17/79 lef RLS lethod y. Mud	Compi	12/. 20.75	50



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N496,507.67 E2,067,952.90

.1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

	SAMPLE					CLASSIFICATION					OPEF	TIES	5
	Type	- I	ţ	Moist		and Remarks	*	% Grave	DAS IN	% Sand	% P200	LL	PI
						Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand (CL,CL-ML)							
					الباليال		c						
						: .	C C						i I
				-		Tan to Brown Fine to Coarse SAND, Little to Some Silt and Clay, Little to Some Gravel, Occasional Cobbles and Boulders (SM)	CC					•	
00072 00073	SS SS	X	M	56		•		4		94	2		
					40-	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)	С						
						(Continued)		Ī		}			



Project	Badger Army Ammunition Plant	
	Baraboo, Wisconsin	

cation N496,507.67 E2,067,952.90

Boring No. \$1125 Surface Elevation 801. § Job No. C 8742

Mos. Type Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Mosture Most			SA	MP	LE	•	CLASSIFICATION		SOIL	.PRC	OPER	RTIES '		
Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) Comparison of the Coarse SAND, Little to Some Gravel, Occasional Cobbles and Boulders Coarse Canada Cobbles and Boulders Coarse SAND, Little to Some Canada Cobbles and Boulders		_	÷ ,		-		and Remarks	*	irave	Sand	9500],	
Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) C C C C C C C C C C C C C C C C C C C	NO.	קעין	"	╀,	+	Depth		<u> </u>	%	8	×	-	<u> </u>	
		SS	X	M			Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) Tan to Brown Fine to Coarse SAND, Little to Some Silt and Clay, Little to Some Gravel, Occasional Cobbles and Boulders	. vo						



WARZYN | LOG OFTEST BORING

Project	Badger Army A	Ammunition Plant
		Wisconsin
		E2,063,332.17

Boring No.		S 1	125
Surface El	ev	ation	874.70
Job No	Ç	8742	
Sheet		of	<u>3</u>

_1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

SAMPLE						CLASSIFICATION			PRO)PEF	RTIES	3
	overy Type	· 1	ļ	Aoisti N		and Remarks	*	%Grave	% Sand	% P200	LL	Ы
D0076 D0077 D0078	SS SS	x	D	1 1 4	-1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand (CL,CL-ML)(Silty Clay Appears to Grade into Underlying Sand)		8	48 70	44 8		
						Tan to Brown, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM.SW-SM) (SP)	С					
					25- -1- -1- -1- -1- -1- -1- -1- -1- -1- -	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt					•	
				•		and Clay (SP,SP-SM)						
						(Continued)						



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N500,012.88 E2,063,332.17

Boring No	\$11	25
Surface E	levation	874_7C
Job No	C 8742	(
Sheet	? of	

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE Recovery Moisture						CLASSIFICATION	-	SOIL PROPERTIES				
	Type	1	,		Depth	and Remarks	*	%Grave	% Sand	% P200	LL	
00079			M			Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)		6	92	2		
					75-							
					85- - - - - - - - - - - - -	Stiff Clay Layer 89' to 90'	С					



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N500,012.88 E2,063,332.17

Boring No. \$1125 Surface Elevation 874.70 Job No. C 8742 Sheet 3 of 3

1409 EMIL STREET • P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (608) 257-4848-

SAMPI	LE	CLASSIFICATION	SOIL PROPER				TIES	
Recovery No. Type	Moisture N Depth	and Remarks	*	%Grave	% Sand	% P200	LL	PI
D0080 SS X W		Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) * * * * * * * * * * * * *	Sta Cre Drif	r2/11 rw Chik	JERA /80 (JFS,	Comple MLC F	2/1 AC	1/80 E #1



Project Badge Army Ammunition Plant
Baraboo, Wisconsin
Location N503,380.50 E2,063,312.68

Boring No. S1127
Surface Elevation 87
Job No. C 8742
Sheet 1 of 2

_ 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4846_

	S	A	JPL	E	•	CLASSIFICATION		SOiL	PRO	PEF	RTIES	<u>``</u>
	Type	1	1	Moist	Depth	and Remarks	*	%Grave	% Sand	% P200	LL	PI
				N	Depth 5 5 6	and Remarks Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand (CL,CL-ML)	c c c c c c	% Grave	.98	% P200		PI
·						to Coarse Gravel, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM) (Continued)						



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N503,380.50 E2,063,312.68

Boring No. S1127
Surface Elevation 878.31
Job No. C 8742
Sheet 2 of 2

.1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848_

	S	A٨	APL	E		CLASSIFICATION		SOIL	PRO	OPE	RTIES	5
	overy Type	‡	†	Aoistu	Depth	and Remarks	*	%Grave	% Sand	% P200	LL	PI
D0082	SS	X	М	54	-			19	77	4		
D0083	SS	x	W	24		Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)		0	96	4	•	
						Thin Layer of Reddish Brown Clay at 74' End Boring at 75'	Cn	2/7/ w Chi	′80 (AL NO	2/8	/80 CE#1



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location M504,039.10 E2,062,711.52

Boring No	\$112	28.
Surface E	levation	
Job No	C 8/42	
Sheet	of	2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

SAMPLE ·					CLASSIFICATION		SOIL	PRC	PEF	TIES		
Recover	7 1	1	Moisti		and Remarks	*	%Grave	% Sand	P200	LL	F1	
No. Typ				Depth 1	Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand (CL,CL-ML)		%	%	1%			
						0 0						
D0085 SS	X	M			Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)				-			



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N504, 039.10 E2,062,711.52

Boring No. \$1128 Surface Elevation 877.19 Job No. \$2. \$2. \$2.

.1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4846.

	S	AA	MPLE			CLASSIFICATION		SOIL	. PRC	PEF	RTIES	3
	avery Type	1 1	1	Moist	Depth	and Remarks		% Grave	% Sand	% P200	LL	Pi
D0086	SS	x	W	62	- - - - - - - - - - - - - - - - - - -	Fine to Medium SAND, Trace to Little Fine to Coarse Gravel, Trace to Little Silt and Clay (SP,SP-SM)		0	97	3		
				7	1.1.160 1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	Tan to Brown Fine to Coarse SAND, Little to Some Silt and Clay, Little to Some Gravel, Occasional Cobbles and Boulders (SM)	CC C				•	
D0087	SS	NR	-		75- 	SANDSTONE, Well Sorted Fine Grained, Calcitic Cement Weathers to a White Silt End Boring at 75'						
				_	85- 11 11 11 12 190-	•	Cre	nt] 2/	NERA 18/79 ofH othod	comple FSF	ete ^J .2/. eg AC	19/ E.#1

WARZYN

ENGINEERING INC

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N503,571.75 E2,068,121.29

Surface Elevation
Job No. C 8742
Sheet 1 of 3

1409 EMIL STREET • P.C. BOX 9636, MADISON, WIS. 53715 • TEL. (608) 257-4848...

	S	Aλ	/PL	Ε		CLASSIFICATION		SOIL	OIL PROPERTIE			<u> </u>
	ype		↓ A	Aoist	Depth	• and Remarks		%Grave	% Sand	% P200	LL	
00088	SS	X	D	NA	بابابائيابايا	Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand (CL,CL-ML)		6	12		42.8	24
D0089	SS	X	н	57		Brown Fine to Coarse GRAVEL and to Some Fine to Coarse Sand, Little Silt and Clay Occasional Cobbles and Boulders (GP-GM) Tan to Brown, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional	CC B B CB BC C CCCCC C	53	38	9		
		•			1.40- 1.1.1.1.1.45-	Cobbles and Boulders (SP-SM,SW-SM) (SP)	C					



Project .	Badger A	rmy Ammuni	tion Plant
			onsin
	N503,57		

Boring No. \$1129	
Boring No. \$1129 Surface Elevation	910.95
JOB No. C 8742	
Sheet 2 of	_

_1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848-

	S	A٨	1PL	E		CI ASSIFICATION		SOIL PROPERTIES				
Recove No. Tvo	_	+		Moist		and Remarks	*	Grave	Sand	, P200	LL	PI
	ery			N		Tan to Brown, Stratified Fine to Coarse SAND, and to Some Fine to Coarse Gravel, Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)	-	ē	% Sand	% P200	_	
D009C SS	S	I R	-	Y ₁	80- 1-1-1-1-85- 1-1-1-1-1-1-1-1-1-90-	Gravel, Occasional Cobbles and Boulders (SM)	в с с с	-	1			
				•		(Continued)				· .		



Project	Badger Army A	mmunition Plant
		Wisconsin
		F2-068-121.29

Boring No. \$1129 Surface Elevation Job No. C 8742

						STREET • P.O. BOX 9638, MADISON, WIS. 53715 • TEL. (60						
			/Pl			CLASSIFICATION		SOIL PROPERTIES				
Re Ng.	Type	- 1	,	Moist	Depth	and Remarks	*	% Grave	% Sand	% P200	LL	
				V	11.1.1.1.5 55	Tan to Brown Fine to Coarse SAND, Little to Some Silt and Clay, Little to Some Gravel, Occasional Cobbles and Boulders (SM)	00000					
				1/2/1/1/1/1/1/1/1/1/1/		SANDSTONE, Well Sorted Fine Grained, Calcitic Cement Weathers to a White Silt						
					1-20- 1-25- 1-30- 1-35- 1-35-	End Boring at 120'	0	2/6 w Ch	IERA /80 c	omple KH _F		180



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N504,612.08 E2,071,642.61

Boring No. S1131
Surface Elevation
Job No. C 8742
Sheet 1 of 4

1409 EMIL STREET + P.O. BOX 9838, MADISON, WIS. 53715 + TEL. (608) 257-4848_

SAMPLE					E		CLASSIFICATION	SOIL PROPERTIES					
	Type	•	+	, A	Aoisti	Depth	and Remarks	*	% Grave	% Sand	% P200	LL	p
						.	Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand (CL,CL-ML)						
						بابارآبابایا فالیاریا	Brown Fine to Coarse GRAVEL and to Some Fine to Coarse Sand, Little Silt and Clay, Occasional Cobbles and Boulders (GP-GM)	c c					
	,					الماليالياليالياليالياليالياليالياليالياليا	: •	B B					
						20-	Large(1'-5' diameter) Granitic Boulders 20-35'	88888				•	
						ىلىلىلىلىلىلىلىل.		8 88888					
				myllin jöre elmi i	•			В					
•						- - - 45-							



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N504,612.08 E2,071,642.61

Boring No. \$1131 Surface Elevation 940.90 Job No. C 8742

1408 EMIL STREET • P.O. BOX 9638, MADISON, WIS. 53715 • TEL. (608) 257-4848 ...

S	SAI	MP	LE	•	CLASSIFICATION		SOIL	. PR	PROPERTIES		
Recovery No. Type	1	1	Mois		and Remarks	*	% Grave	% Sand	% P200	u	ſ
00092 SS	X	M	60			B B B B B B B B B B B B B B B B B B B	51	41	8		
0093 55	X	М	46		Cobbles and Boulders up to 15' in diameter (Sandstone Matrix Weathers to a White Silt)	B C BCC	52	25	23		



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N504,612.08 E2,071,642.61

Boring No. S1131
Surface Elevation 940.90
Job No. C 8742
Sheet 3 of 4

. 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848 -

	SAMPLE			E		CLASSIFICATION	SOIL PROPERTIES							
	Type	- 1	À	Aoisti	Depth	and Remarks	*	%Grave	% Sand	% P200	u	PI		
NO.	TV.					QUARTZITE CONGLOMERATE, Yellow Brown Sandstone and Red Clay Matrix, Quartzite Cobbles and Boulders up to 15 in diameter (Sandstone Matrix Weathers to a White Silt) :		%	*	%				
						(Continued)								



WARZYN | LOG OF TEST BORING

Project	Badger Army Ammunition Plant
,	Baraboo, Wisconsin
	N504,612.08 E2,071,642.61

Boring No.	S1	131
Surface El		
Job No. 🚊		
Sheet	.4 of	4

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

SAMPLE	•	CLASSIFICATION		SOIL	PRC	PEF	OIL PROPERTIES		
Recovery Moist		and Remarks	*	%Grave	% Sand	% P200	LL	PI	
No. Type † † N	Depth			<u>×</u>	*	8			
		QUARTZITE CONGLOMERATE, Yellow Brown Sandstone and Red Clay Matrix, Quartzite Cobbles and Boulders up to 15' in diameter (Sandstone Matrix Weathers to a White Silt) End Boring at 155'	SE DE	ri 2/3 ew Chi ling M tary	JERA 3/79 c of JR Mud	Comple /HS p	nd 2		



WARZYN | LOG OF TEST BORING

Project	Badger Army Ammunition Plant
	Baraboo, Wisconsin
Location	N502,464.29 E2,072,997.91

Boring No	\$1132
Surface Elevation	
Job No C 8742	•••••
Sheet of	4

_1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848...

	S	A	JP L	E		CLASSIFICATION		SOIL	PRO	PEF	TIES	3
	Type	1	+	Moisti	Depth	and Remarks	*	% Grave	% Sand	% P200	LL	PI
,						Brown to Reddish Brown Clayey SILT, Trace to Little Fine Sand (CL,CL-ML)						
					- - - - - - - - - - - - - - - - - - -	Cobbles and Boulders Between 5 and 9'	CCB					
					الىلىل قى		С		·	:	٠	
					11111111	: . -	СВССССС					
					-20- 	Fluid Losses Through Cobble Zone 9' to 29'	000000				•	
					-25 - - - -		CBCC					
				•		Brown Fine to Coarse GRAVEL and to Some Fine to Coarse Sand, Little Silt and Clay, Occasional Cobbles and Boulders (GP-GM)	С					
							CC					
					40-	-	C B C C					
						(Continued)						



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N502,464 29 E2,072,997.91

Boring 1	No.		S 1	132	
Surface	EH	evat	ion .	Q V	
Job No.	C	874	12	• • • • • • • • • • • • • • • • • • • •	
Sheet	2		of	4	

. 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (606) 257-4848.

	5	iΑλ	/PL	E	-	CLASSIFICATION		SOIL	PRC	PEF	TIES	
	Type	1 1	ļ	Moist	Depth	and Remarks	*	%Grave	% Sand	% P200	LL	PI
D0094	ss	X	М	123	77777777 92	Brown Fine to Coarse GRAVEL and to Some Fine to Coarse Sand, Little Silt and Clay, Occasional Cobbles and Boulders (GP-GM)	ВС	55	39	6		
					 - - - - - - - - - - - - - - - - - -		CC					
						Tan to Brown, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Uccasional Cobbles and Boulders (SP-SM,SW-SM) (SP)	cc	•				
							С					
					75-		С					
D0097	SS	X	М	64			С					
D0097 D0098	SS	X	M	109	- -80- -		١٠					
					- - 85-	•	CC					
					85- - - - - - 90-	·	С					
						(Continued)						



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N502,464.29 E2,072,997.91

Boring No. S1132
Surface Elevation 912.97
Job No. C 8742
Sheet 3 of 4

,1409 EMIL STREET + P.O. BOX 9536, MADISON, WIS. 53715 + TEL. (606) 257-4848.

	S	AA	1PL	Ε_	,	CLASSIFICATION		SOII	_ PRO	OPER	RTIES	3
	Type	1	1	Moist	Depth	and Remarks	*	%Grave	% Sand	% P200	LL	PI
						Tan to Brown Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM,SW-SM) (SP)	000 00000000000000000000000000000000000				•	
00095	SS	X	М	100	1 1 25 1 1 1 30 1 1 1 1 35	Clayey Sand 131'-132'	00 00	0	89	11		
						(Continued)						



Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N502,464.29 E2,072,997.91

Boring No. S1132
Surface Elevation
Job No. C 8742
Sheet 4 of 4

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848.

SAMPLE	CLASSIFICATION		SOIL PROPERTIES					
Recovery Moisture No. Type N Depth	and Remarks	*	%Grave	% Sand	% P200	LL	P	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Clayey Sand 142'-145' Tan to Brown, Stratified Fine to Coarse SAND, And to Some Fine to Coarse Gravel, Trace to Little Silt and Clay, Occasional Cobbles and Boulders (SP-SM.SW-SM) (SP)	Sta Cre Dril	GEN	JERA /80 co	L NC	te .2		

Project Badger Army Ammunition Plant - Baraboo, WI.. cacion N 3,021.422 ... E 5,149,283

-					Ī				
_	SA	MPLE		CLASSIFICATION		Soli	PROPE	RTIES	Γ
	. Γ			and Remarks	% Grave 1	Sand	% P200	LL	P1
		Stan. Pen.	Depth		Ç.	Š	à.		
17			-	Very dark grayish-brown (10 yr 3/2) clayey silt (ML)					
-1.6		4	7	Dark brown (10 yr 3/3) silty clay (CL)	0	24	76	27	14
-16			2	Brown (10 yr 4/3) silty sand (SM)	0	78	22	NP	NP
13		6	3	Brown (10 yr 4/4) silty clay (CL) common, medium; distinct mottles (seasonal perched water condition)					
21		7	- +	Brown (10 yr 4/4) silty, clayey, sand (SM-SC)	0	65	35	22	3
20			- 5	Yellowish-brown (10 yr 5/4) silty clay (CL)	0	20	80	29	10
	- }	13							
			6						
			7						
			8	_	·			,	
			9	(Continued)					

Project Badger Army Ammunition Plant
Baraboo, Wisconsin
Location N. 3.021.422...E.5.149.283

S	SAMPLE			SOII	. PKOP	RTIES	
1	Stan.	CLASSIFICATION and Remarks	% Grave 1	% Sand	% P200	LL	P1
	Pen. Depth		9	-	-		
14	- 10 -	Light, yellowish-brown, gravelly sand (SW) (10 yr 6/4)	18	79	3	NP	N P
0.4	- 20	- Very pale brown (10 yr 7/4) sand (SW)	2	97	1	NP	NP
	30		;				
	40						
	- 50				;		
	- 60						
	70						
	80	Wet sample					
	· 90	Light yellowish-brown (10 yr 6/4) silty sand (SW-SM) End of Boring	0	90	10	NP	NP

roject Badger Army Ammunition Plant Baraboo. WI............
Location. N.2,801.577... E 6,204.146

	Sample			_	Soll	PROPE	RTIES	-
→	Stan. Pen.	Depth	CLASSIFICATION and Remarks	% Grave 1	% Sand	7. P200	LL	Pl
31			V. dark grayish-brown (10 yr 3/2) clayey fine to medium sand (SC)	12	40	48	28	10
	7	- 1	Brown (10 yr 4/4) to yellowish- brown (10 yr 5/4) clayey silt	0	33	67	27	5
24	8	2	30% fine and very fine sand (ML)					
		3	Common, medium, distinct mottles (seasonal perched water condition)			·		
17 9	14	-	Yellowish, brown (10 yr 5/4) fine sandy silt (ML)	0	46	54	NP	N P.
		5 +	Pale brown (10 yr 6/3) gravelly, silty, sand	9	85	6	NP.	NP
	18	4 1 1	(SW-SM)					
		6						
		7						
		- - - 8	· 					
		9	(Continued)					

Project. Badger Army Ammunition Plant ... Baraboo .. Wisconsin ... Location N. 2,801,577.... F. 6,204.146

Boring Number, 5-83-1148	
Surface Elevation 7.99.49.	
Job Number 4.910	
Sheet 2 of 2	

	SAMPLE				SOIL	PROPE	RTIES	
1	Stan. Pen. Depth		CLASSIFICATION and Remarks		% Send	% P200	LL	Pl
0.2		- 10	- Pale brown (10 yr 6/3) gravelly sand (SW)	42	54	4	NP	NP
		20						
		30						
		40						·
		- 50 -						
		- 60		ļ				
		70						
		-	End of Boring					
		80	•					
			· -					

	S	AMPLE				SOIL	. PROPE	RTIES	
	\	Stan		CLASSIFICATION and Remarks		%	% P200	LL	Pl
,		Pen.	Depth	Very dark grayish-brown (10 yr 3/2) silty clay (CL,ML)					
	29		E	silty clay (CL,ML)) 		
		6	1 † -	- 26% fine and very fine sand	0	26	74	35	16
1	:		- 2	Varu dark grandak kurun (10 un 2/2)					
		5		Very dark grayish-brown (10 yr 3/2) clayey silt (ML)					
	29		3 +	26% fine and very fine sand	0	26	74	39	10
	28	8	- 4						
	24	12	- 5	Very dark grayish-brown (10 yr 3/2) silty clay (CL)	0	18	82	33	10
			- 6 -	Dark brown (10 yr 3/3) sandy clay (CL-ML)	0	44	56	20	7
I			- 7						
)		8	_					
F			9	(Continued)					

Project Badger Army Ammunition Plant Baraboo Wisconsin
Location N. 3.252.536 E. 7,110.671

S	SAMPLE			SOIL	. PROPE	RTIES	
\	Stan.	CLASSIFICATION and Remarks	% Grave1	% Sand	7 P200	LL	Pl
11	Pen. Depth	Brown (10 yr 4/3) gravelly sand (SW)	8	89	3	NP	NP
19	- 40 - - 50	Brown (10 yr 4/3) gravelly silty sand (SM)	14	72	14	ΝP	NP
	- 60 - - - - 70	· ,					
	- 80	End of Boring					_

						<u> </u>		
	SAMPLE				SOL	L PROPE	RTIES	,
	Stan.		CLASSIFICATION and Remarks	% Grave 1	% Sand	7 P200	LL	Pl
14		· · ·	Very dark grayish-brown (10 yr 3/2) silty sand fill					
12	16	- 1 - - -	Dark brown (10 yr 3/3) clayey sand fill					
	21	2-	Dark brown (10 yr 3/3) gravelly sandy silt fill					
6		- 3	Brown (10 yr 4/3) gravelly silty sand fill		<u> </u>			
20		-	Very dark grayish-brown clayey (10 yr 3/2) silt fill		•			
	36	- 4	Dark brown (10 yr 3/3) gravelly ——clayey sand fill———————————————————————————————————	ļ				
21		- 5	Very dark grayish-brown (10yr 3/2) clayey silt fill					
	6	- - 6	Very dark grayish-brown (10 yr 3/2) silty clay fill					
22	12	- 7 -						
	30	8	Brown (10 yr 4/3) gravelly silty sand fill					
		ا و ا	(Continued)					

A CONTRACTOR OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF TH

APPENDIX B LOG OF TEST BORING

Badger Army Ammunition Plant Baraboo, Wisconsin N.14,918.656.E.8,243_989

	SAMPLE					SOIL PROPERTIES						
~	Stan.	Depth.	CLASSIFICATION and Remarks	7 Grave 1	Sand	2 P200	LL	Pl				
42			Very dark grayish-brown (10 yr 3/2) clayey silt (MH) original topsoil	0	5	95.	56	13				
23	4	10	Brown (10 yr 4/3) silty clay (CL) Many, coarse, prominent mottles ——(seasonal perched water condition)—	0	4	96	37	20				
10	:	- 20	Brown (10 yr 4/4) silty, clayey sand— (SM-SC)	-5	67 —	28-	-17-	-3-				
10		30 _	Brown (10 yr 5/3) silty sand (SW-SM)	1	88	11	NP	NP				
		40										
		- 50										
		70										
9		80	Brown (10 yr 5/3) gravelly silty sand (SM)	5	83	12	NP	NP				
		- -				ļ) (

Colect..Badger.Army.Ammunition.Plant...Baraboo,.Wisconsin.......

s	Sample	•	SOIL PROPERTIES							
Stan. Pen. Depth		CLASSIFICATION and Remarks	% Grave 1	y y y	% P200	LL	Pl			
	- - 100									
	- 110	Brown (10yr 5/3) gravelly silty sand (SM)								
	120									
	- 130 - - - 140									
	- - 150	End of Boring								
	- 160									
	170	· ·				-				

	SAMPLE				SOIL	. PROPE	RTIES	
1	Stan. Pen.	Depth	CLASSIFICATION and Remarks	% Grave 1	% Sand	7. P200	LL	Pl
			Brown (10 yr 4/3) silty sand (SW-SM)	2	93	5	NP	NP
22	7	1						
		2_	Very dark grayish-brown (10yr 3/2) silty clay (CL)	0	14	86	30	9
	6	- 3						
	8				·			
25	7	5						
		6						
	9	7						
		- 8	Dark-brown (10 yr 3/3) to brown (10 yr 4/3) silty clay (CL)	0	3	97	36	21
			(Cortinued)					

Project Badger Army Ammunition Plant - Baraboo, Wisconsin... beation. N. 21.898.327. E.12.254.520

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7	s	AMPLE				SOIL	. PROPE	RTIES	
				CLASSIFICATION and Remarks	% Grave 1	2 Sand	2 P200	LL	P1
5		Stan. Pen.	Depth		GE	1S	P.		
		26	10	Many coarse, prominent mottles (seasonal perched water condition) (5'-10')					
ŀ	 16		<u></u>	Brown (10 yr 4/4) clayey sand (SC)	0	55	45	28	9
			20	(SW-SM) gravelly, silty sand	35	55	10	NP	NP
				- Very pale brown (10 yr 7/4) sand (SW)	ī	95	4	NP	ΝP
			30						
	5		40	Light yellowish-brown (10 yr 6/4) gravelly silty sand (SM)	18	69	13	NP	NP
			50						
:		-	60			·			
			70						
		- 1. A da k a	80	· -					
,}	ļ		90	(Continued)					

	Army Ammunition Wisconsin	Plant

	SAMPLE		SOIL PROPERTIES							
!		CLASSIFICATION and Remarks		% Send	7. P200	LL	P1			
<u>~</u>	Stan. Pen. Depth		2 Gravel	S	2					
	F									
	7 100									
	<u> </u>									
	F 110	Light yellowish-brown (10 yr 6/4) gravelly silty sand (SM)								
	<u> </u>									
	1 - 120	•								
	130									
	- 149									
	- 140									
		gud of Bonins								
	- 150	End of Boring								
	- 160									
	1 -	· .								
	1 - 170									

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LOG OF TEST BORING

Project Badger Army Amounition Plant.....

Location Baraboo, Wisconsin

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Boring No. S-85-1152A
Surface Elevation
Job No. C. 12228
Sheet 1 of 1

SAMPLE Recovery Moisture					VISUAL CLASSIFICATION	so	L P	ROP	ERT	IES	
Recovery I		١.,			and Remarks	Qu	w	LL	Pί	0	
lo.	Type	*	į.	N	Depth						
					E						i
				-							
					-10-	See Log of Boring S-85-1152B			<u> </u>		
					E	for Soil Descriptions					
_											
				<u> </u>	<u>-</u> 20 -	10' Protective Casing	-				
					E	Earth Drill to 55' with Rock					
						Bit					
					F-30-						
					E						l I
					40-						
					El						!
	i							<u>. </u>			
					50-	·					
					F L						
						End Boring at 55'					
_					60 -	·					
											ı
					E70 -						
						•					
		.			E				, 		
		1	10	/ A T	-80 -	VEL OBSERVATIONS	GE	NER	ΔΙ	NOT	
While Drilling			_ Stan	/26/8 Chief	5 Com	pieté	26/8 110				

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LOG OF TEST BORING

Project Badger Army Ammunition Plant Location Baraboo, Wisconsin

Boring No. \$-85-11525 Surface Elevation . . . Job No. C. 12228 Sheet 1 of 2

	S	AM	IPL	E .		VISUAL CLASSIFICATION	SO	IES			
	Reco	very	1	sture		and Remarks	Qu	w	u	PL	D
No.	Type	+	+	N	Depth				1		
			-	-	Ē	0-10" Dark CLAY SILT			 -		,
						(Moved 1' & Pushed Shelby Tube from 2-4')					
1_	SS	18"	М	5	E 5	Lean, Brown Silty CLAY with					
. —	-				E	Some Sand Seams			<u> </u>		
2	SS	12"		20		81 304 344 8 300					
	33	12"	M	32	10-	Advanced to 10' with Auger Pushed 6" Protective Casing	-				
		ĺ			F	Medium to Coarse SAND, Little					!
3	SS	8"	М	18		Gravel, Trace Silt & Clay (SP)			-		
<u> </u>	133	3	-	10	<u>-</u> 15-						
		}									
4	SS	9"	M	47	F_						
• - •		r - -			20-						
					E						
 5	SS	8"	М	48	25-						
					E						
6.	SS_	_8"_	M	51	<u>=</u> 30-						
					E						
 7		7.5"	<u></u>	<u> </u>					 		<u>_</u>
′ –	SS	1 <u>5</u> "	· M 	55	35-			·			<u> </u>
 8	SS_	12"	— М	1094	1						
<u>.</u> .	ا . ـ د د	<u> </u>	<u> </u>	1.20.5	40-				1		
 2	sş	14"	M_	42	<u></u>	(Stratified with Gravel Seams					
-			_		F"]	to Depth of 45')					
						(Continued)					1



Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Surface Elevation
Job No. C 12228
Sheet 2 of 2

Recovery Moisture No. Type	LL PL						
No. Type	LL PL						
Gravel, Trace Silt & Clay (SP) Dense, Brown Fine to Medium SAND with Trace Silt and Clay (SP)							
Dense, Brown Fine to Medium SAND with Trace Silt and Clay (SP) 1 SS 14" W 58 55 55 55 55 55 55 55 55 55 55 55 55							
SAND with Trace Silt and Clay (SP) SAND with Trace Silt and Clay (SP) SAND with Trace Silt and Clay (SP)							
Clay (SP) 1							
2 SS 10" W 109.5" 50 -							
2 SS 10" W 109,5" 60 -							
2 SS 10" W 109,5" 60 -							
2 SS 10" W 109 5" 60							
2 55 10" 14 63							
2 55 10" 14 63							
2 55 10" 14 63							
3 SS 10" W 63 = 65							
3 SS 10" W 63 F 65							
3 SS 10" W 63 65							
4 SS 10" W 42 F 70							
5 SS 10" W 109 5" 75							
End Boring at 75'							
End Boring at 75							
80							
·							
85							
	GENERAL NOTES						
While Drilling Start	9/23 / Complete						
Upon Completion of Drilling — Crew Chief-							
Time After Drilling Drilling Meth	od						
Depth to Water	•						

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1

LOG OF TEST BORING

Project Badger Army Ammunition Plant
Location Baraboo, Wisconsin

Boring No. S-85-1153
Surface Elevation
Job No. C 12228
Sheet 1 of 4

_	S	AM	PL	E		VISUAL CLASSIFICATION	SOIL PROPERTIES						
No.	Reco	Recovery Moist				and Remarks	Qu	w	LL	PL	0		
No.	Type	+	\	N	Depth		7		ш	PL	U		
					<u> </u>	0-10" Dark Brown Sandy SILT							
1_	SS	10"	M	9	F	Stiff Brown Lean CLAY, Trace			!	-			
2	SS	17"	M	+	Εl	Sand (Pushed 3" Shelby Tube, 3-4.5' and Bent by Cobbles			-	-			
	33	17	171		- 5-	CARL CAND - A P. CAL	7		 	<u> </u>	ļ		
				 	E	Silty SAND at 4.5' with Little Gravel and Cobbles							
					F								
_3	SS	10"	М	54	E ₁₀	Drilled to 10' with Auger and Placed 6" Protective							
					F"	Casing							
					EL		╛		Ì		1		
	SS	8"	M	37	-	White Fine to Medium SAND,			 	-			
₹	123	0	15	13/	E 15-	Trace Gravel, Trace Silt							
					F]		}				
				 	E	Medium to Coarse SAND, Some	-		-				
5	ZZ_	9"	M	42	E20-	Gravel, Little Silt and			 				
					FI	Clay (SW-SM)			[[<i>,</i>		
					Εl								
6	SS	6"	М	38	F_								
					25								
	 						-						
7 .	SS	12"	<u>M</u> _	45	-30-		1						
					E								
				<u> </u>	F					<u></u> .			
8	SS	12"	_M_	66	35-				ļ	i .			
					FIL	/0.133.00	┧│				! !		
					E	(9/17/85 Drilling mud 13.6' from Ground Surface)	1.						
 .و.	22	7/"	м	94_	F	Ground Surface) Dense, Light Brown Fine to							
. 	33.	+# -	_ 171 -	+ 74 - 	E 40 7	Medium SAND, Little Gravel, Little Silt and Clay (SP-SM)					 		
		·			-	2.30.0 2 2 0.0y (a. 0)							
10	<u>cc</u>	 18"	M	144	E _		-		 		<u> </u>		
	33	10	<u>—</u>	144	45-		} }						
							1						
						(Continued)							

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LOG OF TEST BORING

Badger Army Ammunition Plant Project

Location Baraboo, Wisconsin

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= · · · · · S-85-1153

Surfuce Elevation Job No. C 12228

2 Sheet

	SAM	PL	E		VISUAL CLASSIFICATION	SOIL PROPERTIES						
Rei Na. Type	covery			enth	and Remarks	qu	w	li	, PL	ر ۵		
11 SS	!			-	Dense, Light Brown Fine to Medium SAND, Little Gravel, Little Silt and Clay (SP-SM)				· · · · · · · · · · · · · · · · · · ·	· -		
12 SS	5-12"	М	109 12	-55-	Dense, Light Brown Fine to Medium Silty SAND (SM)				• -	1		
13 SS	8"	М	109 12	-60-						-		
14 SS	12"	М	109 12	65-	Some Gravel							
15 SS	8"	М	100g 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 100g 1- 1	-70-	Brown Fine to Medium SAND, Little Gravel, Little Silt and Clay (SP-SM)							
16 SS	5 5"	М	1097 <u>=</u>	75 –						-		
17 SS	4"	М	100g. -	80-	Well-Graded SAND, Some Gravel, Little Silt & Clay (SW-SM)							
18 SS	3"	М	109,-	85-			_					
19 SS	4"	<u>M</u>	1008.	.90-				-				
		ļ			(Continued)							

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LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

Boring No. S-25-1153
Surface Elevation
Job No. C 12228
Sheet 3 of 4

... 1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848 ...

	s	AN	1PL	E		VISUAL CLASSIFICATION	so	IL PF	70P	ERT	IES
	Reco	very	Mo	sture		and Remarks	Qu	w	LL	PL	D
No.	Туре	•	7	N	Depth	*	_			, r.	
20	SS	6"	М	10g.		Fine to Medium SAND, Little Gravel, Little Silt & Clay (SP-SM)					
21	SS	5"	М	109,"	100	(9/18/85 Drilling Mud 26.6' from Ground Surface)					
22	ss	6"	М	100%.	F-105-						4
23	SS	4"	M	0g.	H10-	·					
24	ss	6"	M	09.		Dense, Brown Fine to Medium SAND, Little Silt and Clay					
25	SS	4"	M	00g.	- - - - - - - - - - - - - - - - - - -						
26	SS	5"	М	 100 8	- - - - - - - - - - - - - - - - - - -						
27	ss	5"	W	109 c	130 - 15 - 16 -	Very Dense, Brown, Well-Graded SAND & GRAVEL, Little Silt and Clay (SW-SM)					4
28	SS	6"	w ¹	PQ.,	- 	Appears Saturated (9/19/85 Drilling Mud at 26.4' from ground surface)					
						(Continued)					

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LOG OF TEST BORING

Project Badger Army Ammunition Plant

Location Baraboo, Wisconsin

SAMPLE .						VISUAL CLASSIFICATION	SOIL PROPERTIES								
	Recovery No. Type		Moi	sture		and Remarks									
No.	Type	÷	7	N	Depth		Qu	W	וו	PL	D				
				100	ابلداداد	Very Dense, Brown, Well-Graded SAND & GRAVEL, Little Silt and Clay (SW-SM)	 								
9_	SS	1"	W	TO A	40	(Changed Bits from 5 7/8" to 9 1/4")	<u> </u>		<u>: </u>						
0	ŞŞ	0"		100	E L	Very Hard Drilling Cuttings Indicate Mostly QUARTZITE									
		.v			145	End Boring at 143.0'									
						(Reamed Hole to 143.0' with 5 7/8" Bit)									
5				-	150-					-					
_	-														
				-	155										
				-											
			·	 	160										
				<u> </u>							· · <u>-</u> -				
- •					1 65-										
	<u> </u>				-170-										
					-					1					
					-175-			· <u></u>			· • · • · ·				
Ē		'	W		·	VEL OBSERVATIONS	1	NER							
νh	ile Dr	illing						9/16/8							
ام		mple	tion		Orilling		Crev	Chief	LS F						

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